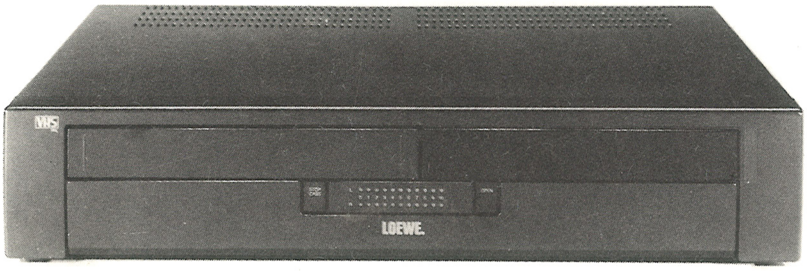
LOEWE.

Kundendienst-Serviceanleitung



VHS

PAL

VHS
OC 1620 H
Videorecorder
Art.-Nr.52536

Sicherheitsvorschriften
Bei Reparaturarbeiten an den Geräten sind die Sicherheitsbestimmungen gemäß VDE 0860 und Nachträgen zu beachten und einzuhalten.
Spezielle Bauteile in den Geräten dürfen aufgrund ihres Aufbaues nur durch Originalteile ersetzt werden. Außerdem sind die am Reparaturort gültigen Schutzbestimmungen der Bundesgenossenschaft beim Umgang mit diesen Geräten einzuhalten. Hierzu gehört auch die Beschaffenheit des Arbeitsplatzes.
Die Kenntnis dieser Vorschriften ist die Voraussetzung, um einen fachgemäßen Service der Geräte durchführen zu können.
Bei Betrieb dieser Geräte im Ausland sind die jeweiligen Schutzbestimmungen des Landes zu berücksichtigen und einzuhalten.

SAFETY PRECAUTIONS
The following precautions should be observed when servicing.
1. Since many parts in the unit have special safety-related characteristics, always use genuine LOEWE replacement parts. Especially critical parts in the power circuit block should not be replaced with other makes.
2. Before returning a repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that is completely safe to operate without danger of electrical shock.

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230-90249. 999

INTRODUCTION

This service manual provides a variety of service information. It contains the mechanical structure of the Video Cassette Recorder(VCR) together with mechanical adjustments and the electronic circuits in schematic form. This VCR was manufactured and assembled under our strict quality control standards and meets or exceeds industry specifications and standards.

TOTAL CONTENTS

SECTION 1······SUMMARY
SECTION 2······CABINET & MAIN FRAME
SECTION 3······ELECTRICAL
SECTION 4······MECHANISM

NOTE) This section is provided separately. When checking the mechanical problems, refer to the manual (Part No. 494-004L) provided separately.

SECTION 1

SUMMARY

CONTENTS

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IMPORTANT SAFETY PRECAUTIONS........1-3
- Precautions during Servicing

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- Dielectric strength test
- Clearance distance
- Leakage current test

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KEY TO ABBREVIATIONS

A	AC	Alternating Current
	ACC	Automatic Color Control
	ADJ	Adjust
	A/E	Audio Erase
	AFC	Automatic Frequency Control
	AFT	Automatic Fine Tuning
	AGC	Automatic Gain Control
	ALC	Automatic Level Control
	AM	Amplitude Modulation
	AMP	Amplifier
	ANT	Antenna
	APC	Automatic Phase Control
	ASS'Y	Assembly
	AUD	Audio
	AUTO	Automatic
	AUX	Auxiliary
B	B	Base
	BPF	Bandpass Filter
	BW or B/W	Black and White
C	C	Capacitor, Chroma, Collector
	CAN	Cancel
	CAP	Capstan
	CATV	Cable Television
	CBA	Circuit Board Assembly
	CCD	Charge Coupled Device
	CFG	Capstan Frequency Generator
	CH	Channel
	CHROMA	Chrominance
	CLK	Clock
	CNR	Chroma Noise Reduction
	COMB	Combination Comb Filter
	COMP	Comparator Composite Compensation
	CONV	Converter
	CS	Chip Select
	CST	Cassette
	CTL	Control
	CUR	Current
	CYL	Cylinder
D	D	Drum, Digital, Diode, Drain
	dB	Decibel
	DC	Direct Current
	DEMOD	Demodulator
	DET	Detector
	DEV	Deviation
	DHP	Double High Pass
	DIGITRON	Digital Display Tube
	DL	Delay Line
	DOC	Drop Out Compensator
	D/V	Dummy Vertical
E	E	Emitter
	EE	Electric to Electric
	EMP	Emphasis
	EP	Extended Play
	EQ	Equalizer
	ES	Electrostatically Sensitive
F	F	Fuse
	FB	Feed Back
	FBC	Feed Back Clamp
	FE	Full Erase
	FF	Fast Forward
	FG	Frequency Generator
	FL	Filter
	FM	Frequency Modulation
	F/R	Front/Rear
	FS	Frequency Synthesizer
	FSC	Subcarrier Frequency
	F/V	Frequency Voltage
	FWD	Forward
G	GEN	Generator
	GND	Ground
H	H	High, Horizontal
	Hz	Hertz
I	IC	Intergrated Circuit
	IF	Intermediate Frequency
	INS	Insert
	I/O	Input/Output
L	L	Low, Left, Coil
	LD	LED
	LECHA	Letter Character
	LP	Long Play
	LPF	Low Pass Filter
M	MAX	Maximum
	MD	Modulator
	MIC	Microphone
	MIN	Minimum
	MIX	Mixer, Mixing
	M.M.	Mono Multi Vibrator
	MMV	Monostable Multivibrator
	MOD	Modulation, Modulator
	MODEM	Modulator-Demodulator
N	NR	Noise Reduction
O	OSC	Oscillator
	OSD	On Screen Display
P	PB	Playback
	PCB	Printed Circuit Board
	PG	Pulse Generator
	PLL	Phase Locked Loop
	P-P	Peak-to-Peak
	PRE-AMP	Preamplifier
	PS	Phase Shift
	PWM	Pulse Width Modulation
Q	Q	Transistor
	QH	Quasi Horizontal
	QSR	Quick Setting Record
	QTR	Quick Timer Record
	QV	Quasi Vertical
R	R	Resistor, Right
	RE(or RC)	Remocon, Receiver
	REC	Recording
	REF	Reference
	REG	Regulated, Regulator
	REMOCON	Remote Control(unit)
	REV	Reverse
	REW	Rewind
	RF	Radio Frequency
	R/P	Record/Playback
	RTC	Reel Time Counter
S	S	Serial
	SH	Shift
	SHARP	Sharpness
	SIF	Sound Intermediate Frequency
	SLD	Side Locking
	S/N	Signal to Noise Ratio
	SP	Standard Play
	SUB	Subtract, Subcarrier
	SW or S/W	Switch
	SYNC	Synchrorization
	SYSCON	System Control
T	T	Coil
	TP	Test Point
	TR	Transistor
	TRK	Tracking
	TRANS	Transformer
	TU	Tuner, Take-Up
U	UHF	Ultra High Frequency
	UNREG	Unregulated
V	V	Volt, Vertical
	VA	Always Voltage
	VCO	Voltage Controlled Oscillator
	VGC	Voltage Gain Control
	VHF	Very High Frequency
	VISS	VHS Index Search
	VR	Variable Resistor or Volume
	V-Sync	Vertical Synchronization
	VTG	Voltage
	VV	Voltage to Voltage
	VXO	Voltage X-tal Oscillator
W	W	Watt
	WHT	White
	W/O	With Out
X	X-TAL	Crystal
Y	Y/C	Luminance/Chrominance
	YNR	Luminance Noise Reduction
Z	ZD	Zener Diode

IMPORTANT SAFETY PRECAUTIONS

Prior to shipment from the factory, the products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

• Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▒) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Use Specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

4. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistor

5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.(Fig. 1)

6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

7. Check that replaced wires do not contact sharp edged or pointed parts.

8. When a power cord has been replaced, check that 10-15Kg of force in any direction will not loosen it.(Fig. 2)

9. Also check areas surrounding repaired locations.

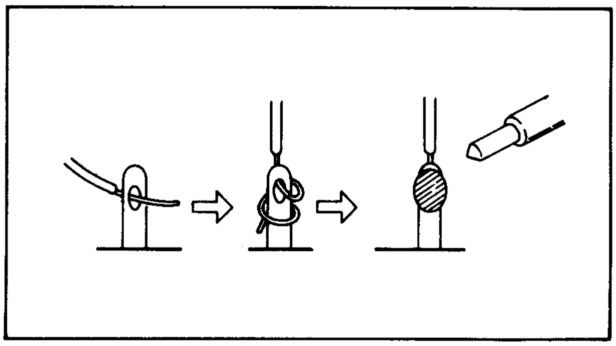


Fig. 1

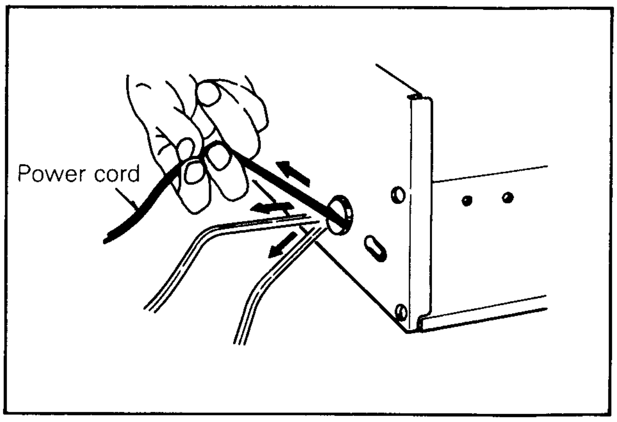


Fig. 2

10. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the parts specified. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

SAFETY CHECK AFTER SERVICING

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

• Insulation resistance test

Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.

• Dielectric strength test

Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set(RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.

• Clearance distance

When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table below.

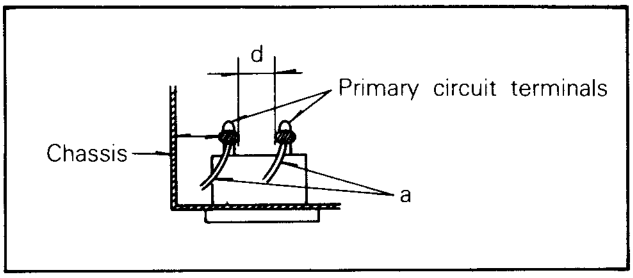


Fig. 3

Table 1:Ratings for selected areas

AC Line Voltage	Region	Insulation Resistance	Dielectric Strength	Clearance Distance(d),(d)
*110 to 130 V 200 to 240 V	Europe Australia	≧10 MΩ/500 V DC	4kV 1 minute	≧6mm(d) ≧8mm(d) (a Power cord)

*Class II model only.

Note. This table is unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

• Leakage Current test

Confirm specified or lower leakage current between B(earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.)

Measuring Method: (Power ON)
Insert load Z between B(earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure and following table.

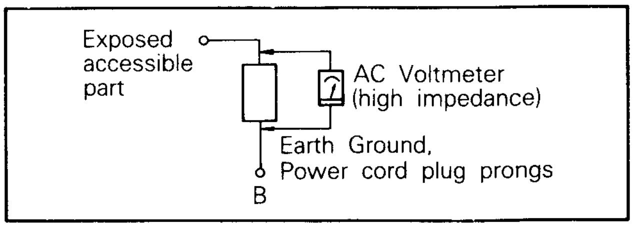

Exposed accessible part
Z
AC Voltmeter (high impedance)
Earth Ground, Power cord plug prongs
B

Fig. 4

Table 2:Leakage current ratings for selected areas

AC Line Voltage	Region	Load Z	Leakage Current(i)	Earth Ground (B) to:
100 to 130 V	Europe	2kΩ	i≦0.7m A peak i≦2m A dc	Antenna earth terminals
200 to 240 V	Australia	50kΩ	i≦0.7m A peak i≦2m A dc	Other terminals

Note. This table is unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

FEATURES

- HQ, High Quality picture enhancement system improves image sharpness and detail
- Double-Azimuth 4-head system
- Hi-Fi Audio sound system
- Simulcast recording Function
- Dual Audio, NICAM (STEREO, BILINGUAL) TV programmes recording
- Digital Link System
- Audio level indicator
- Audio Dubbing Function
- 8 event/1 year programmable timer with everyday recording
- QSR, Quick Set Recording with stand-by (up to 9 hours)
- Programmable channel memory with frequency synthesized tuner (up to 40 positions)
- Full-function infrared remote control
- Auto Power and Play function
- Automatic rewind
- Fine Still, Frame Advance, Variable Slow
- Synchronized Edit function
- Tape Remaining time display function
- Jet Search
- Quick Start Function
- Real Time Counter
- FR Search Function
- Digital Auto Tracking System
- LP Record and Playback Function
- Auto Head Cleaner

SPECIFICATIONS

General

Power Source :	AC 230V±10%, 50Hz
Power Consumption :	Approx. 38 Watts
Video Recording System :	Double Azimuth 4 heads helical scanning system
Tape Speed :	23.39mm/sec (SP mode) 11.69mm/sec (LP mode)
Tape Format :	Tape Width 1/2" (12.7mm high density tape VHS).
Maximum Recording Time :	4.2hours at SP mode/8.4hours at LP mode (with E-240 cassette)
FF/Rewind Time :	Less than 300secs (with E-180 cassette)
Dimensions (W × H × D) :	16.9" × 3.2" × 14.2" (430 × 82 × 360mm)
Weight :	About 13.66 lbs (6.2 kg)
Operating Temperature :	41°F - 95°F (5°C-35°C)
Operating Humidity :	35%~80%
Timer :	24 hours display type

Video

Television System :	CCIR standard (625 lines, 50 fields) PAL/SECAM Colour signal
Recording Format :	PAL/MESECAM
RF Reception :	PAL B/G, SECAM B/G
RF OUT :	PAL G, SECAM G
Input Level :	VIDEO IN (SCART-PIN, RCA type) 1.0Vp-p, 75ohm, unbalanced
Output Level :	VIDEO OUT (SCART-PIN, RCA type) 1.0Vp-p, 75ohm, unbalanced
Signal to Noise Ratio :	More than 43dB
RF Modulator :	UHF Channels 32-40 (Adjustable)

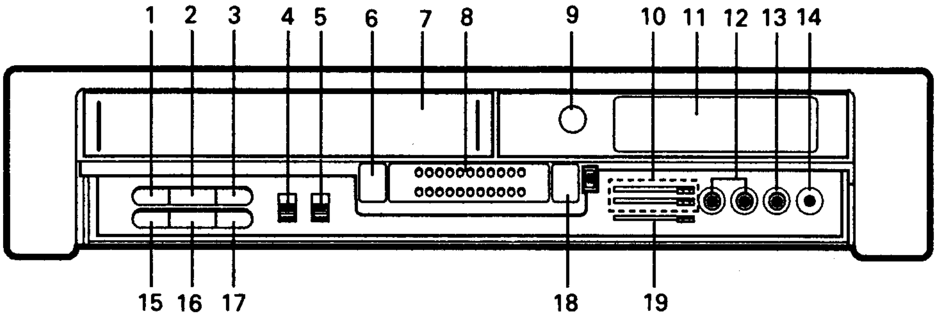
Audio

Input Level :	AUDIO IN (SCART-PIN, RCA type) 0dBm More than 50Kohm
Output Level :	AUDIO OUT 0dBm Less than 1Kohm (SCART-PIN type) -4dBm Less than 10Kohm (RCA type)
Audio Track :	Mono + Hi-Fi track type
Audio Frequency Response :	Normal : 63Hz~12.5KHz ($^{+3}_{-7}$dB), Hi-Fi : 20Hz~20KHz
Signal to Noise Ratio :	FM Audio : More than 68dB
Dynamic Range :	Hi-Fi Audio : More than 86dB (JIS A Filter)

* Designs and specifications are subject to change without notice.

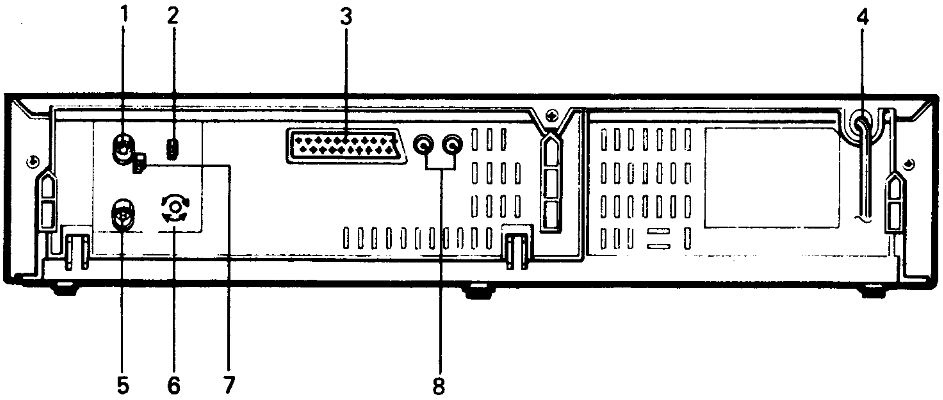
LOCATION OF CUSTOMER CONTROLS

FRONT



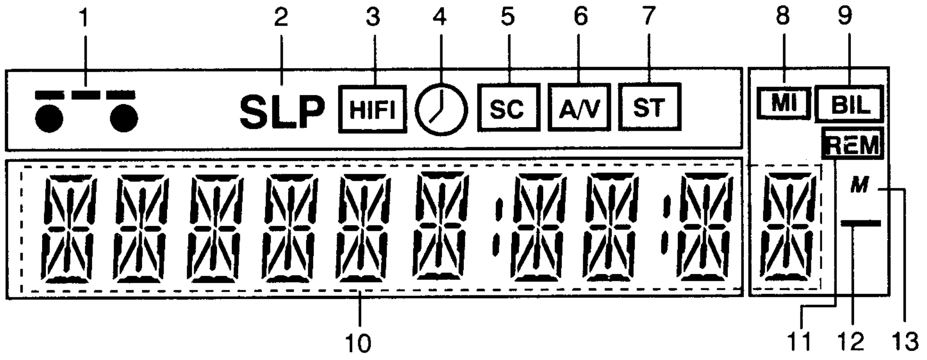
1. REWIND / REVIEW BUTTON
2. PALY BUTTON
3. FAST FORWARD/CUE BUTTON
4. AUDIO MIX ON/OFF SWITCH
5. TV/VCR CONTROL SWITCH
6. STOP/CASS BUTTON
7. CASSETTE COMPARTMENT
8. AUDIO LEVEL METERS
9. REMOTE SENSOR WINDOW
10. Hi-Fi AUDIO RECORD LEVEL CONTROLS (L/R)
11. MULTI-FUNCTION DISPLAY
12. AUDIO IN JACKS (L/R)
13. VIDEO IN JACK
14. SYNCHRO EDIT IN JACK
15. POWER BUTTON
16. PAUSE/STILL BUTTON
17. RECORD BUTTON
18. CONTROL PANEL OPEN BUTTON
19. SHARPNESS CONTROL

REAR



1. AERIAL INPUT
2. TPSG ON/OFF SWITCH
3. EURO-AV SOCKET
4. MAINS LEAD
5. RF OUTPUT
6. RF CHANNEL CONTROL
7. ATTENUATION (ATT.) SWITCH
8. AUDIO OUTPUT TERMINALS (L/R)

MULTIFUNCTION DISPLAY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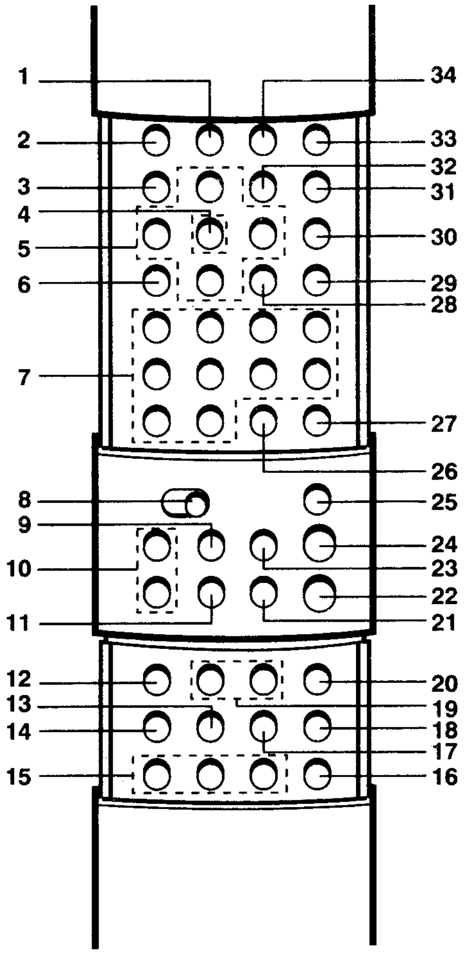
1. CASSETTE-IN INDICATOR
2. TAPE SPEED INDICATOR
3. Hi-Fi INDICATOR
4. TIMER INDICATOR
5. SIMUL CAST INDICATOR
6. LINE INDICATOR
7. STEREO INDICATOR
8. NICAM INDICATOR
9. BILINGUAL INDICATOR
10. FUNCTION INDICATORS
11. TAPE REMAINING INDICATOR
12. MINUS INDICATOR
13. MEMORY INDICATOR

REMOTE CONTROL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1. TELETEXT STOP BUTTON
2. DOUBLE BUTTON
3. VPT YELLOW BUTTON
4. TELETEXT ENTER BUTTON
5. CURSOR BUTTONS (UP, DOWN, LEFT, RIGHT)
6. AV BUTTON
7. NUMBER BUTTONS "0" THROUGH "9"
8. TV/VCR CONTROL SWITCH
9. REWIND/REVIEW BUTTON
10. PROGRAMMING (+/-)/TRACKING (+/-) BUTTONS
11. PAUSE/STILL BUTTON
12. FRAME ADVANCE BUTTON
13. AUDIO DUBBING BUTTON
14. AUTO TRACKING BUTTON
15. VISS BUTTONS (MARK, ERASE)
16. RESET BUTTON
17. TAPE SPEED SELECT BUTTON
18. CLOCK/COUNTER SELECT BUTTON
19. SLOW (+/-) / MFT (+/-) BUTTONS
20. DISPLAY BUTTON
21. RECORD BUTTON
22. STOP BUTTON
23. FAST FORWARD/CUE BUTTON
24. PLAY BUTTON
25. POWER BUTTON
26. TELETEXT CLEAR BUTTON
27. MENU BUTTON
28. TOP BUTTON
29. TELETEXT BUTTON
30. VPT BUTTON
31. VPS/SUBPAGE BUTTON
32. CYAN BUTTON
33. CHILD LOCK BUTTON
34. REVEAL BUTTON

SECTION 2

CABINET & MAIN FRAME

CONTENTS

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2. Front Panel 2-2

CIRCUIT BOARD DISASSEMBLY 2-2

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2. Main Circuit Board (I) (Y/C, Audio, Tuner/IF, Syscon, Servo) 2-3
3. Timer/Key Function Circuit Board 2-3
4. Pre-Amp Circuit Board 2-3
5. Power Circuit Board 2-3

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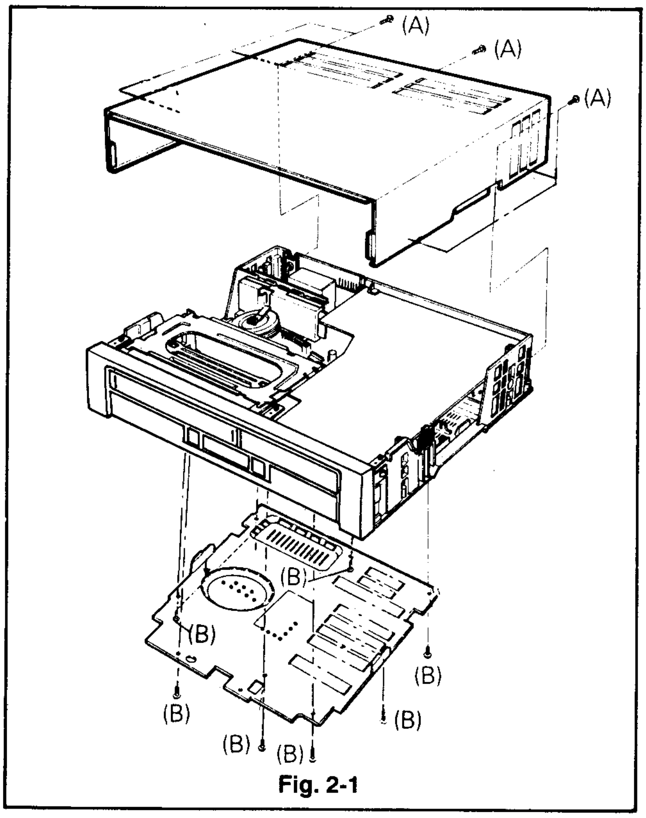
1. Cabinet and Main Frame Section 2-4
2. Packing Accessory Section 2-5
3. Remote Control Section 2-5

CABINET DISASSEMBLY

1. Top Case, Bottom Cover

A. Release 7 screws A (See Fig. 2-1).
B. Hold the back of Top Case and lift it up slightly backward to remove it.
C. Release 9 screws B to remove the Bottom Cover (See Fig. 2-1).


(A)
(A)
(A)
(B)
(B)
(B)
(B)
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(B)

Fig. 2-1

***Caution**
When reassemble the Front Panel, assemble it in condition of inserting the Door Cassette inside, as shown in Fig. 2-3.

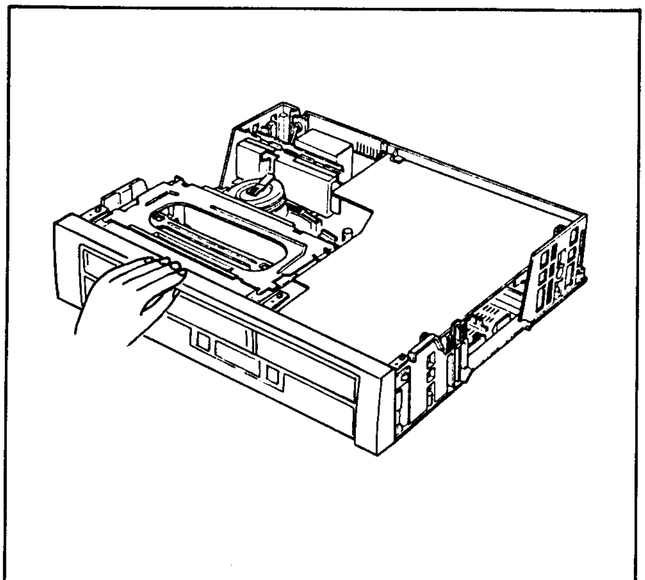


Fig. 2-3

2. Front Panel

A. Remove the Top Case (See Fig. 2-1).
B. Remove the Bottom Cover (See Fig. 2-1).
C. Release 2 screws C (See Fig. 2-2).
D. Remove the stoppers on the top of Front Panel.
E. Remove the stoppers on the Bottom side Front Palenl.

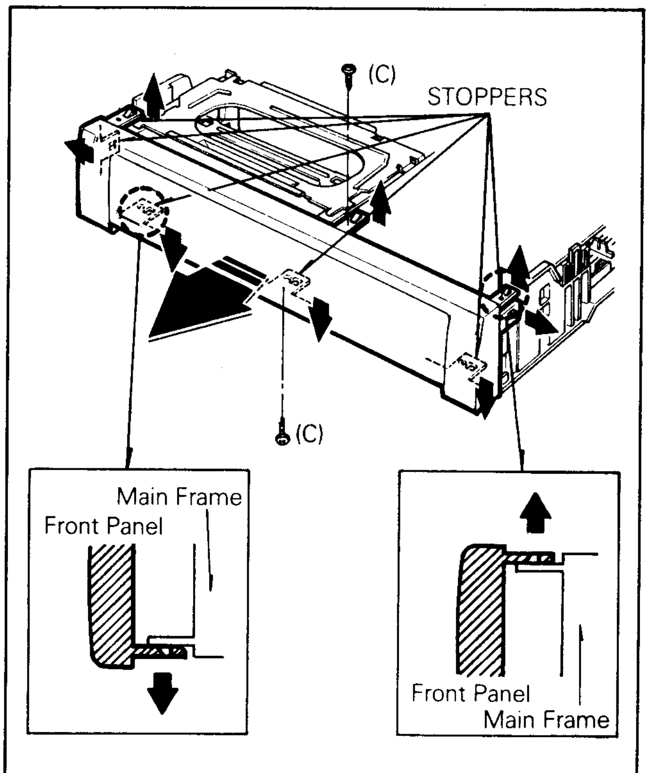

(C)
STOPPERS
(C)
Main Frame
Front Panel
Front Panel
Main Frame

Fig. 2-2

CIRCUIT BOARD DISASSEMBLY

1. Circuit Board Arrangement

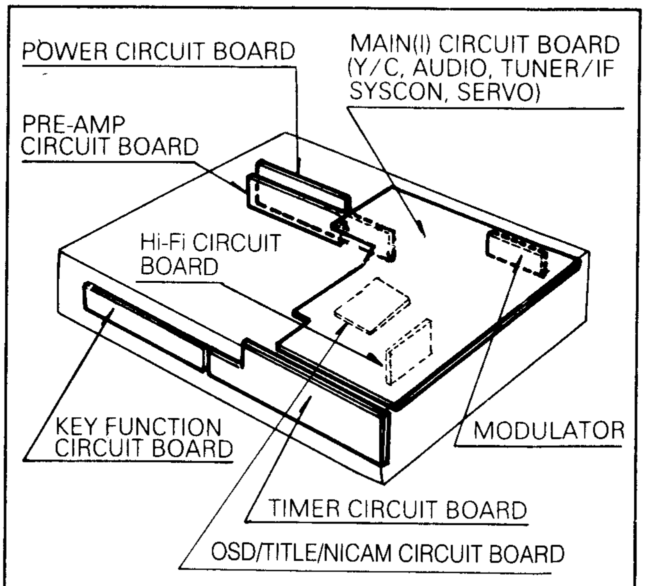

POWER CIRCUIT BOARD
MAIN(I) CIRCUIT BOARD (Y/C, AUDIO, TUNER/IF SYSCON, SERVO)
PRE-AMP CIRCUIT BOARD
Hi-Fi CIRCUIT BOARD
KEY FUNCTION CIRCUIT BOARD
MODULATOR
TIMER CIRCUIT BOARD
OSD/TITLE/NICAM CIRCUIT BOARD

Fig. 2-4

2. Main Circuit Board (I) (Y/C, Audio, Tuner/IF, Syscon, Servo)

A. Release 3 screws D. (See Fig. 2-5)
B. Disconnect the connector between Main and Timer Circuit Board.
C. Lift the rear part up and Pull the P.C.Board backward.
D. Remove the connector for complete removal.

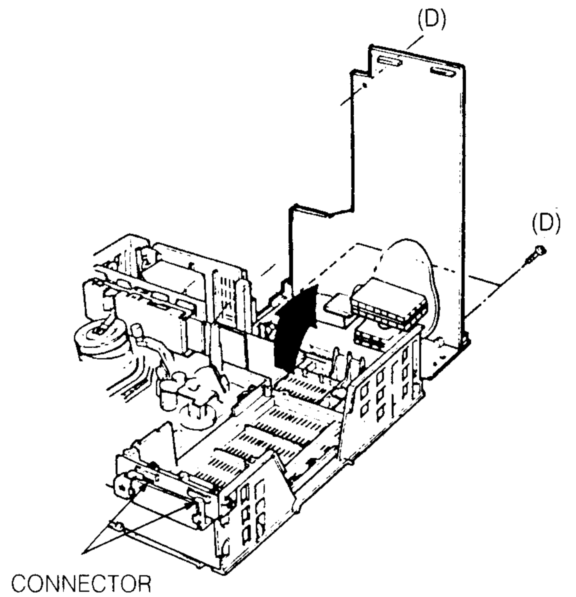


Fig. 2-5

3. Timer/Key Function Circuit Board

A. Pull the P.C.Board toward you while pressing 4 stoppers in the direction of the arrows to disengage and remove the P.C.Board (See Fig. 2-6).
B. Remove the connector for complet removal.

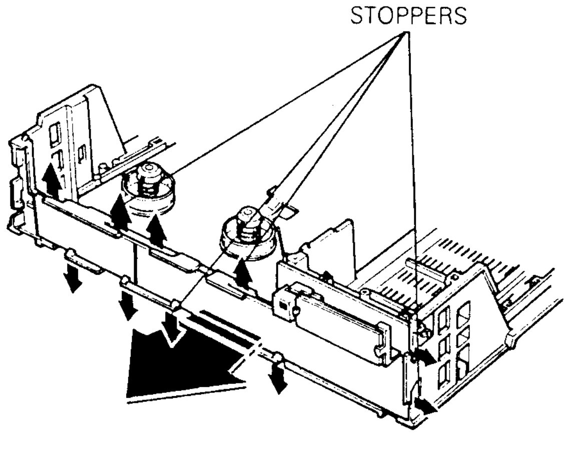


Fig. 2-6

4. Pre-Amp Circuit Board

A. Release 3 screws E.
B. Remove Pre-Amp Package from Main Frame.
C. Remove bracket Pre-Amp from Pre-Amp package.
D. Remove Pre-Amp Circuit Board from Pre-Amp package.

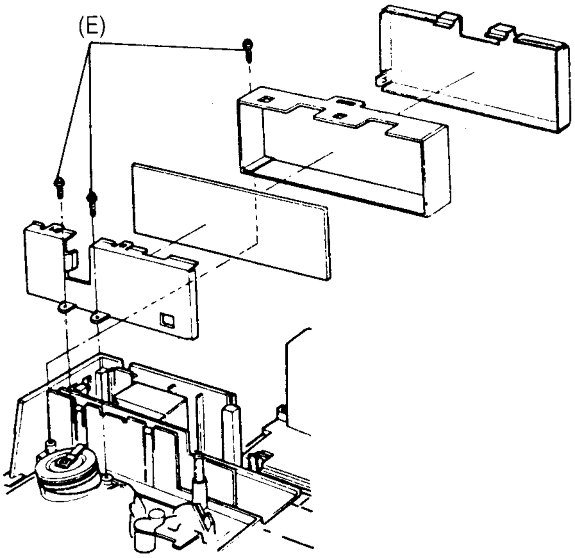


Fig. 2-7

5. Power Circuit Board

A. Remove Main (I) P.C.Board (See Fig. 2-5).
B. Release 4 screws F.

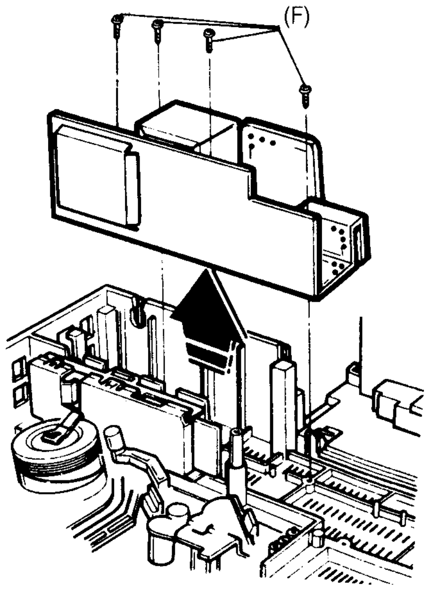
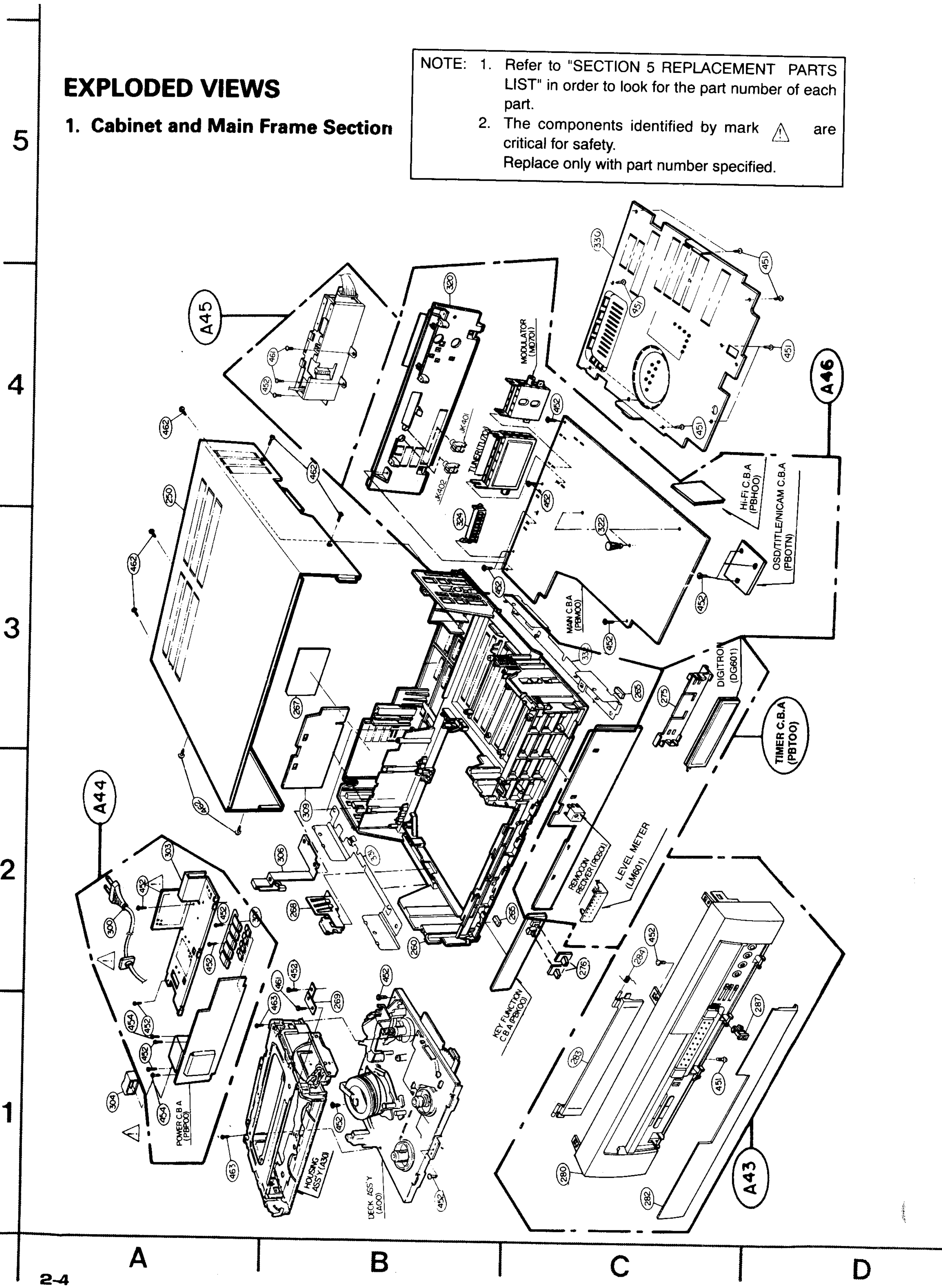


Fig. 2-8

EXPLODED VIEWS

1. Cabinet and Main Frame Section

NOTE:
1. Refer to "SECTION 5 REPLACEMENT PARTS LIST" in order to look for the part number of each part.
2. The components identified by mark ⚠ are critical for safety.
   Replace only with part number specified.



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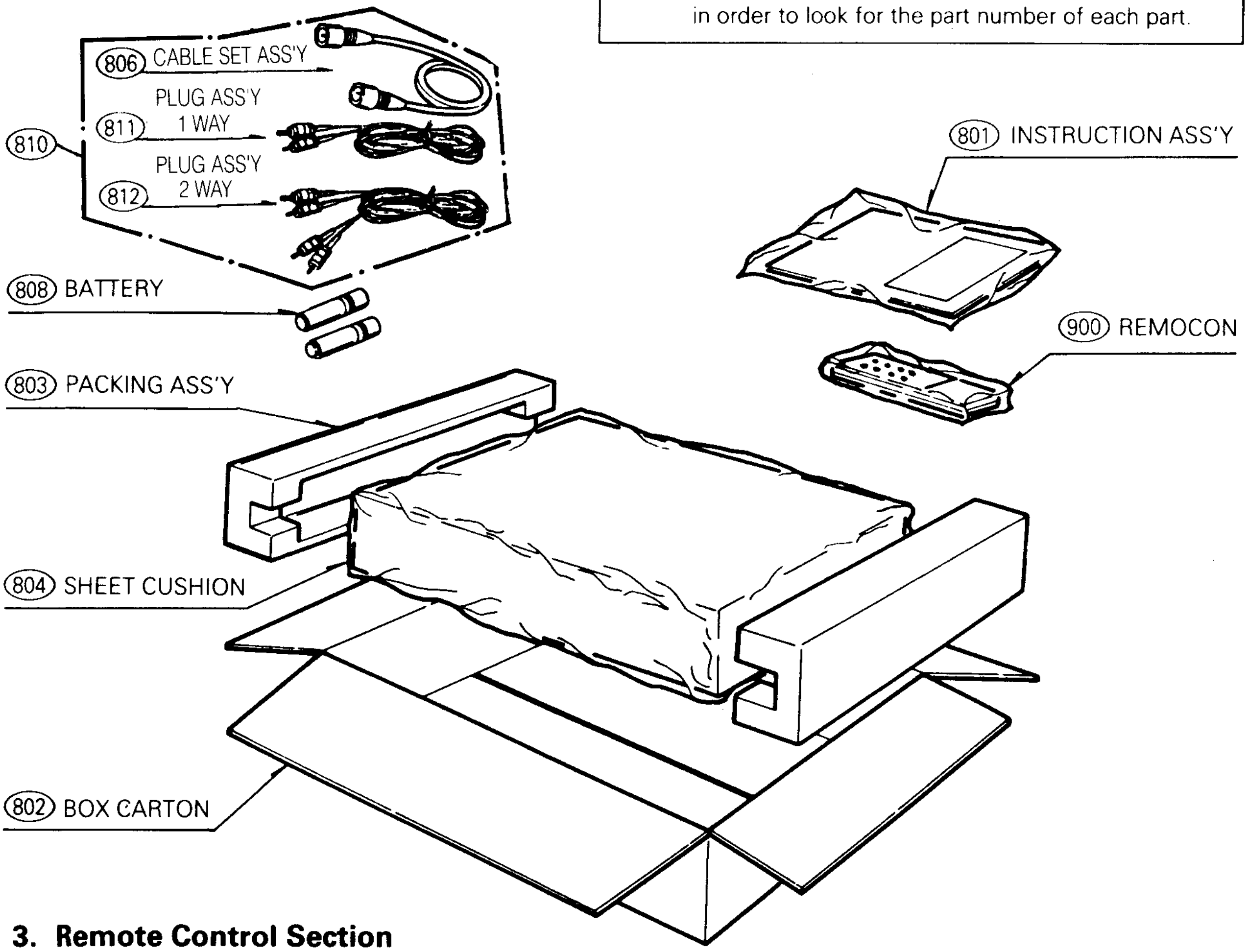
MODULATOR (MD701)
JK401
JK402
TUNER(TU701)
324
322
MAIN C.B.A (PBM00)
330
451
A46
Hi-Fi C.B.A (PBH00)
OSD/TITLE/NICAM C.B.A (PBOTN)
332
285
275
DIGITRON (DG601)
TIMER C.B.A (PBT00)
REMOCON RECEIVER (RQ601)
LEVEL METER (LM601)
KEY FUNCTION C.B.A (PBK00)
276
A44
303
300
301
454
304
POWER C.B.A (PBP00)
463
453
269
HOUSING ASS'Y (A30)
DECK ASS'Y (A00)
284
287
283
280
282
A43

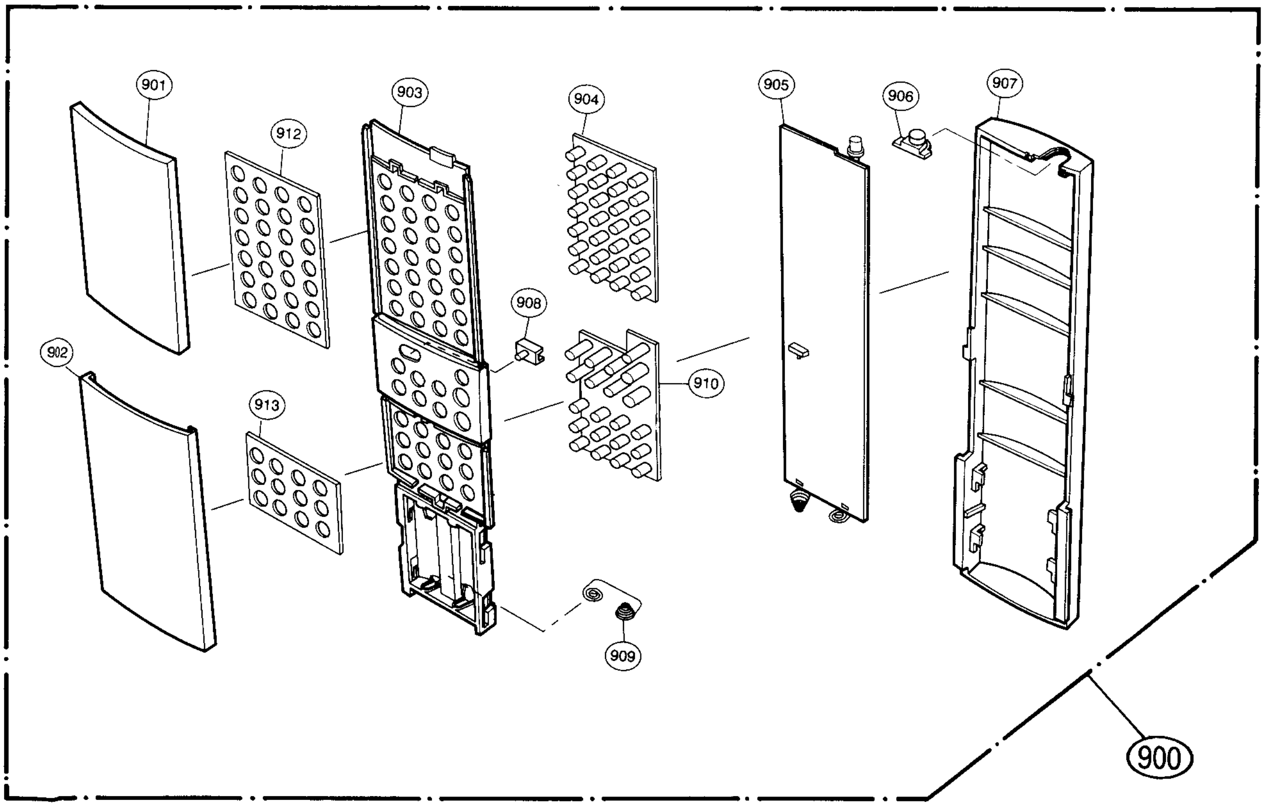
2. Packing Accessory Section

NOTE) Refer to "SECTION 5 REPLACEMENT PARTS LIST" in order to look for the part number of each part.



806 CABLE SET ASS'Y
810
811 PLUG ASS'Y 1 WAY
812 PLUG ASS'Y 2 WAY
801 INSTRUCTION ASS'Y
808 BATTERY
900 REMOCON
803 PACKING ASS'Y
804 SHEET CUSHION
802 BOX CARTON

3. Remote Control Section



901
903
904
905
906
907
912
908
902
910
913
909
900

SECTION 3 ELECTRICAL

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ELECTRICAL ADJUSTMENT PROCEDURES

Electronic Test Equipment Requirement:

- Oscilloscope
- Video Signal Generator
- Modem Tester
- Level Meter
- Frequency Counter
- + Driver
- Test Tape (SP)
- Recording Tape
- Digital Multimeter
- Distortion Meter

1. Servo Circuit

1) ±PG Adjustment

MODE	SPECIFICATION	MEASUREMENT POINT	ADJUSTMENT POINT
Playback	6.5H±0.5H (416μ sec, 1H=64μ sec)	TP304 (W346 H.SW) SCART Pin⑲(Video Out Terminal)	VR201

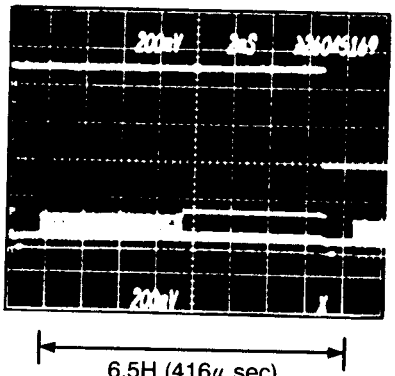
Purpose:
It is for the phase dividing of the Video A, B heads with 180° and the exact tracking of each track to meet head switching point with VHS Spec.

Procedure:
a. Playback a PAL/SP test tape.
b. At this time, the "ATR" is lighting, after pressing the PROG (+) or PROG (−) and adjust the X-Value.
c. Connect CH-1 terminal of oscilloscope to W346 H. SW, and CH-2 terminal to video out terminal (SCART Pin ⑲) of VCR.
d. Trigger the complex Video signal of CH-2 to CH-1 H. SW, and adjust VR201 so that the distance from A(B) head selection point of H.SW signal to the starting point of horizontal synchronized signal is 6.5H (416μ sec, 1H=64μ sec).

Reference)
1. ±PG adjustment is practiced in the state of maximum RF level and locked servo system. (MTR Mode.)
2. The deviation between A/B Head Adjustment location should be within ±0.5H (32μ sec).
3. The deviation between the specification of adjustment and the practical measurement value should be within ±0.5H (32μ sec).
4. Oscilloscope and VCR set should be connected with GND.

Waveform

Composite Video Signal



6.5H (416μ sec)
H.SW (W346)

Fig. 3-1

2. Y/C Circuit

1) EE Level Adjustment

MODE	SPECIFICATION	MEASUREMENT POINT	ADJUSTMENT POINT
Stop	2V±0.2Vp-p.	SCART Pin ⑲	VR302

Procedure:
a. Connect the Video Signal Generator to video in terminal.
b. Connect CH-1 terminal of the oscilloscope to SCART Pin ⑲.
c. Adjust VR302 so that the value from the lower part of synchronism to 100% white signal is 2V±0.2Vp-p.

Waveform

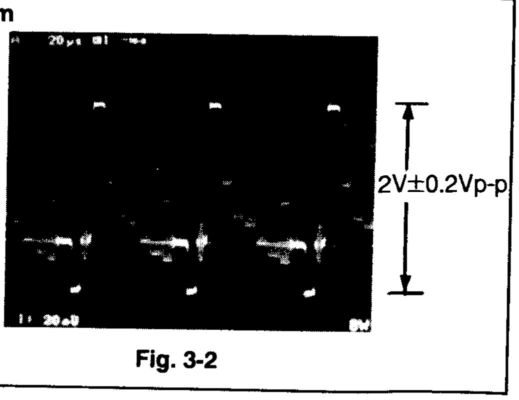


Fig. 3-2

2) Playback Luminance Level Adjustment

MODE	SPECIFICATION	MEASUREMENT POINT	ADJUSTMENT POINT
Playback (SP mode)	2V±0.2Vp-p	SCART Pin ⑲	VR305

Procedure:

a. Connect the Video Signal Generator to video in terminal.
b. Connect CH-1 terminal of the oscilloscope to SCART Pin ⑲.
c. Playback a PAL SP test tape(with 100% white signal).
d. Adjust VR302 so that Video Waveform is 2V±0.2 Vp-p.

Waveform

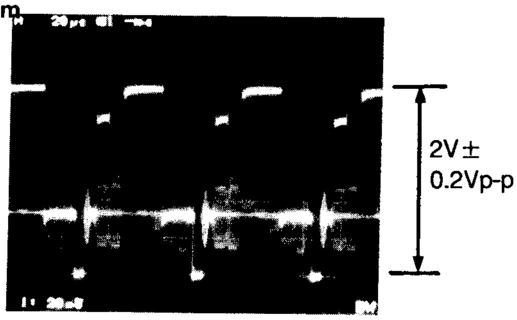


Fig 3-3

3) FM Carrier Frequency Adjustment

MODE	SPECIFICATION	MEASUREMENT POINT	ADJUSTMENT POINT
Record (SP mode)	White Peak : 4.8±0.05MHz Sync Tip : 3.8±0.05MHz	TP302 (IC301 Pin ㉞)	VR301

Procedure:

a. Connect the Video Signal Generator to Video in terminal.
b. Connect CH-1 terminal of the oscilloscope to W713
c. Connect CH-2 terminal of the oscilloscope to modem tester output terminal. (But the set and the modem tester should be connected with 1:1 probe).
d. Connect input terminal of modem tester to TP302.
e. Input the Video Signal of 100% white to Video Input Jack.
f. The terminal position of modem tester is operated to be ATT. 0dB, PAL/SECAM mode, Demod, Marker on.
g. Adjust VR301 to right side in left maximum state so that 3.8MHz Marker on scope is agreed with the lower part of sync.

Waveform

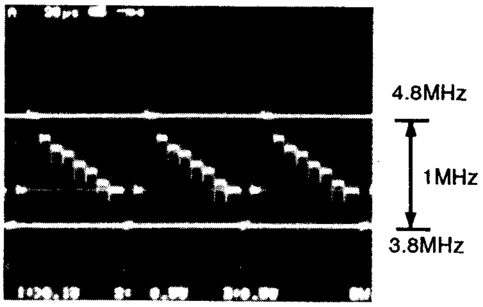


Fig 3-4

4) FM Deviation Frequency Adjustment

MODE	SPECIFICATION	MEASUREMENT POINT	ADJUSTMENT POINT
Record (SP mode)	1±0.05MHz	TP302 (IC301 Pin ㉞)	VR304

Procedure:

a. Connect the Video Signal Generator to Video in terminal.
b. Connect CH-1 terminal of the oscilloscope to W713
c. Connect CH-2 terminal of the oscilloscope to modem tester output terminal. (But the set and the modem tester should be connected with 1:1 probe).
d. Connect input terminal of modem tester to TP302.
e. Input the Video Signal of 100% white to Video Input Jack.
f. The terminal position of modem tester is operated to be ATT. 0dB, PAL/SECAM mode, Demod, Marker on.
g. Adjust VR304 to right side in left maximum state so that 4.8MHz Marker on scope is agreed with the level of100% white signal.

Waveform

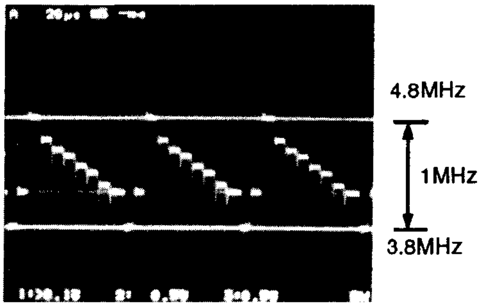


Fig 3-5

5) Recording Luminance Level Adjustment

MODE	SPECIFICATION	MEASUREMENT POINT	ADJUSTMENT POINT
Record (SP mode)	1.4±0.025Vp-p	W811 (Pre-Amp C.B.A) REC Current	VR303 REC-Y

Procedure:

a. Connect the Video Signal Generator to video in terminal.
b. Connect CH-1 terminal of the oscilloscope to W811 of Pre-Amp Circuit Board.
c. Connect CH-2 terminal of the oscilloscope to W713 .
d. Adjust VR303 so that the luminance FM output is 1.4±0.025 Vp-p

Waveform

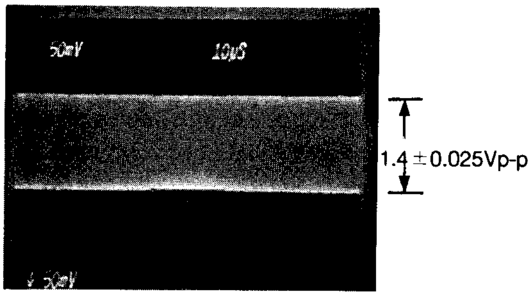


Fig 3-6

3. Audio Circuit

1) Record Oscillation Voltage Adjustment

MODE	SPECIFICATION	MEASUREMENT POINT	ADJUSTMENT POINT
Record	2.4mV±0.2mV RMS	R409 Both Terminal	VR402

Purpose :
This is for adjusting bias voltage to specification in recording.

Procedure:

a. Connect the Level Meter terminal to both terminals R409 in R/P Head PWB.
b. Confirm that the Oscillation Voltage is 2.4mV±0.2mV RMS.
c. At this time, Adjust VR402 and make the Oscillation voltage fit to specification.

4. Hi-FiCircuit

1) Fo Adjustment

MODE	SPECIFICATION	MEASUREMENT POINT	ADJUSTMENT POINT
E.E (without signal)	1.4MHz±5KHz 1.8MHz±5KHz	IC451 Pin ㊽	VR451 VR452

Procedure:

A. With Jig for adjusting fo
  a. Connect the Jig input terminal for adjusting fo to IC451 Pin ㊽ .
  b. Connect the Jig output terminal for adjusting fo to the Frequency Counter.
  c. Choose the 1.4MHz , 1.8MHz Switch of the Jig for adjusting fo.
  d. Adjust VR451 so that the Frquency Counter is 1.4 MHz±5KHz and VR452 so that the Frequency Counter is 1.8MHz±5KHz.

B. Without Jig for adjusting fo
  a. Disconnect the P4801 connector Ass'y from Hi-Fi circuit board.
  b. Connect the IC451 pin ㊽ to the P4801 pin ①.
  c. Connect the Frequency Counter to IC451 pin ㊺ and adjust VR451 so that the Frequency Counter is 1.4MHz±5KHz.
  d. Connect the Frequency Counter to IC451 Pin (52) and adjust VR452 so that the Frequency Counter is 1.8MHz±5KHz

Reference:
The Set and the Frequency Counter should be connected with 1:1 probe both A and B method.

5. Tuner/IF Circuit

1) VIF Adjustment

MODE	SPECIFICATION	MEASUREMENT POINT	ADJUSTMENT POINT
EE mode (without signal)	Refer to Waveform	IC701 Pin⑭	T701

Procedure:

a. Connect as shown in Fig. 3-8
b. Attenuate the sweep OSC gain by 25±5dB.
c. Adjust T701 so that the waveform of monitor is as shown in Fig. 3-7.

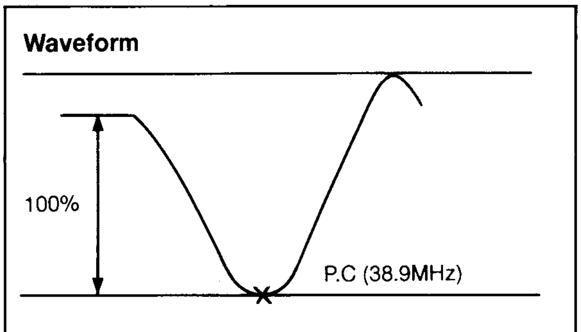


Fig. 3-7

Connection:

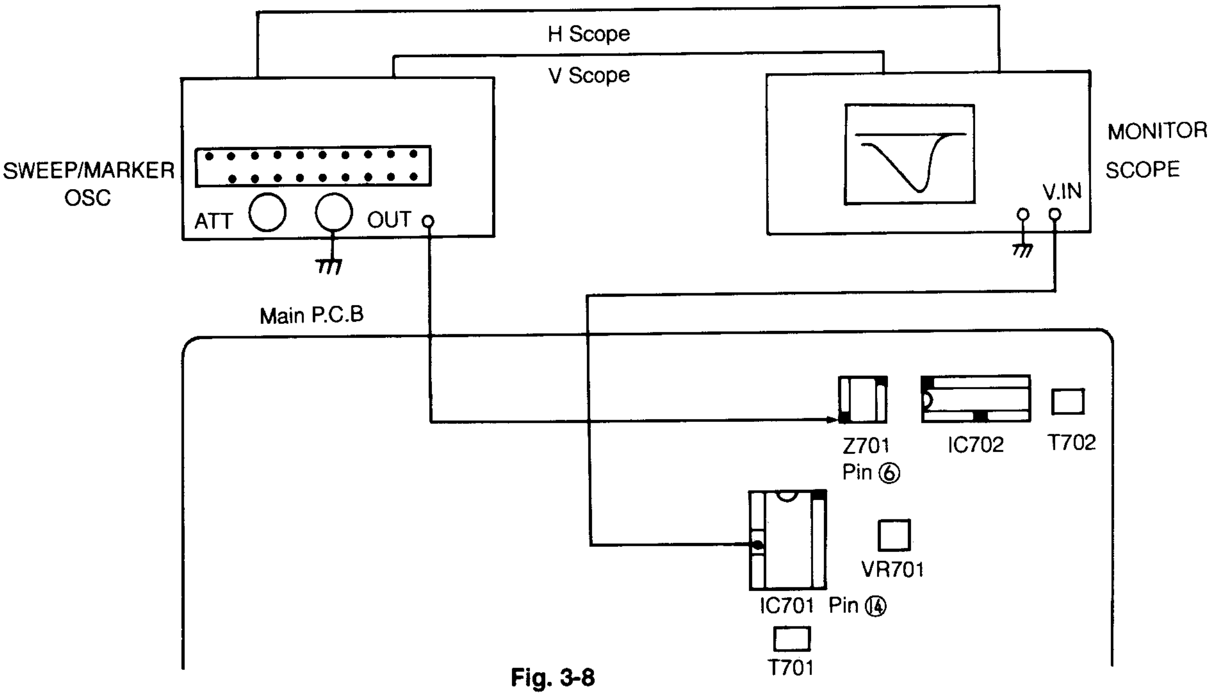

H Scope
V Scope
SWEEP/MARKER
OSC
ATT
OUT
MONITOR
SCOPE
V.IN
Main P.C.B
Z701
Pin ⑥
IC702
T702
VR701
IC701 Pin ⑭
T701

Fig. 3-8

2) AGC Adjustment

MODE	SPECIFICATION	MEASUREMENT POINT	ADJUSTMENT POINT
CH-11(217.25MHz) Normal Reception	5.5±0.1V	TUNER AGC Terminal	VR701

Procedure:

a. Be tuning CH-11 (strength of RF electric field: 70dB µV) fine.
b. Connect the Digital Voltmeter to AGC terminal of TU701.
c. Adjust VR701 so that the Digital Voltmeter is 5.5±0.1V.

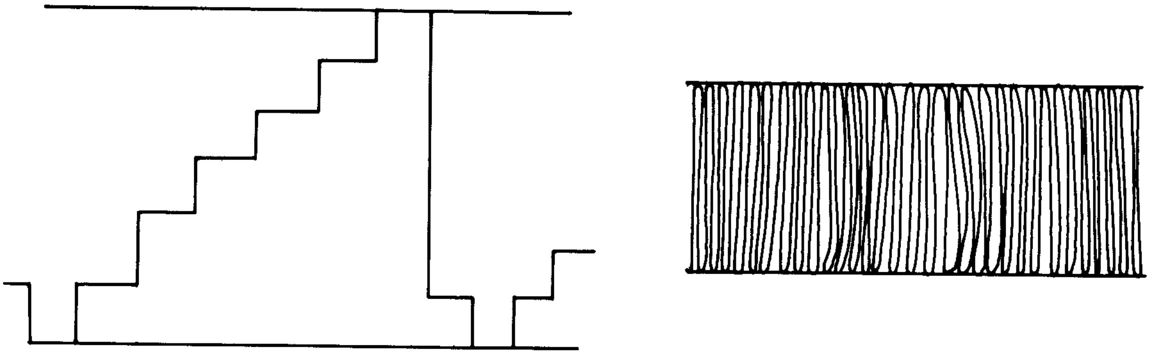
3) SIF Adjustment

MODE	SPECIFICATION	MEASUREMENT POINT	ADJUSTMENT POINT
CH-11 (Normal Reception)	Refer to Adjustment	IC702 Pin ⑫	T702

Procedure:

a. Be tuning CH-11 (217.25MHz) fine.
b. Connect the Oscilloscope to IC702 Pin ⑫.
c. Adjust T702 so that the waveform of Oscilloscope is as shown in Fig. 3-9.

Waveform



Before Adjustment

After Adjustment

Fig. 3-9

***Caution in testing**

1. When practing this adjustment, adjust after more than 10minutes with TV set turning on.
2. Adjust after completing itself test of measuring apparatus.
3. Sweep OSC marker frequency is followed by Table 1.
4. IF are adjusted and Tuner is not.

***Abbreviation**

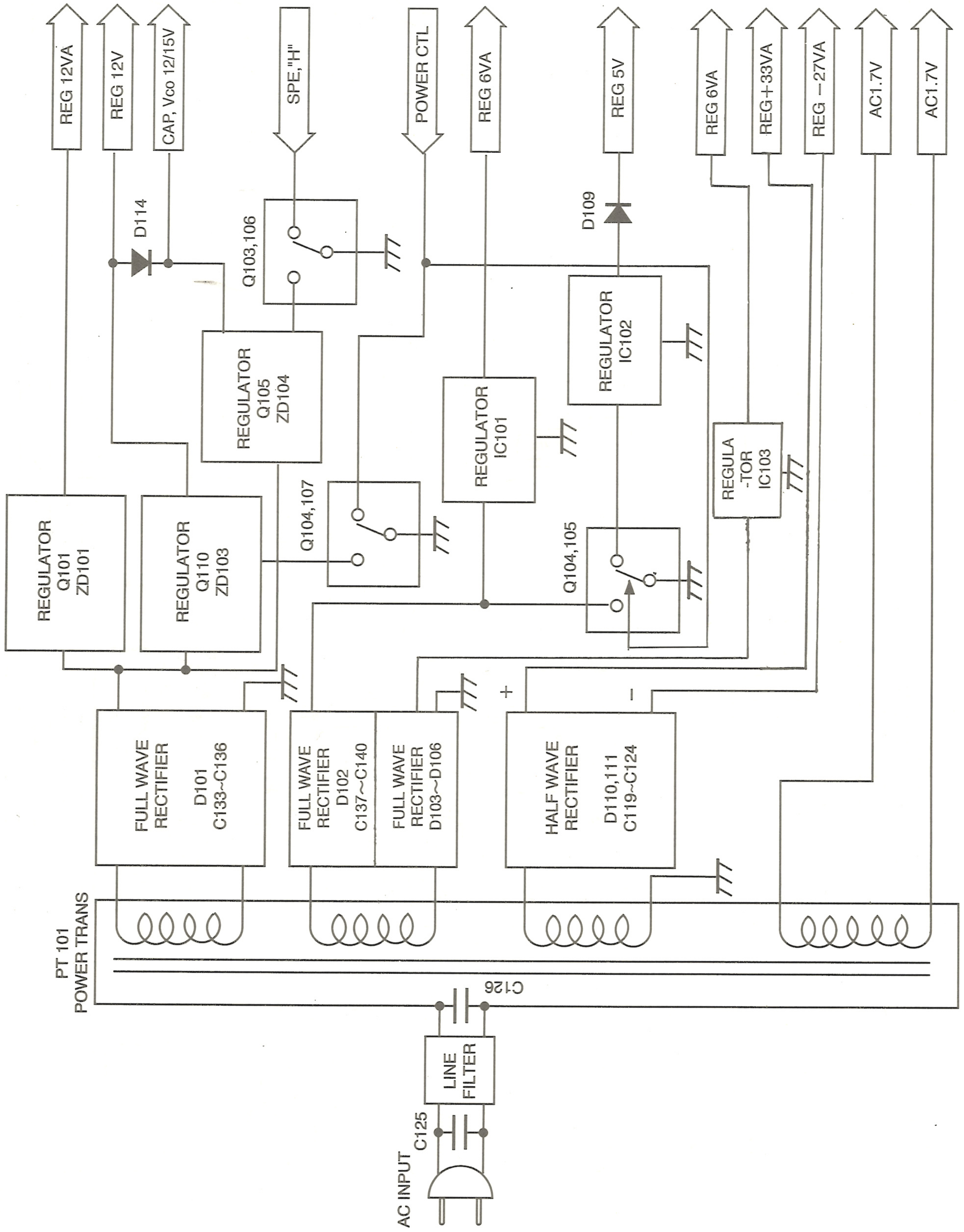
- APC: Adjacent Picture Carrier
- SIF: Sound Intermediate Frequency
- CIF: Color Intermediate Frequency
- CEN: Center Frequency
- PIF: Picture Intermediate Frequency
- ASC: Adjucent Sound Carrier

Table 1 Frequency Table (MHz)

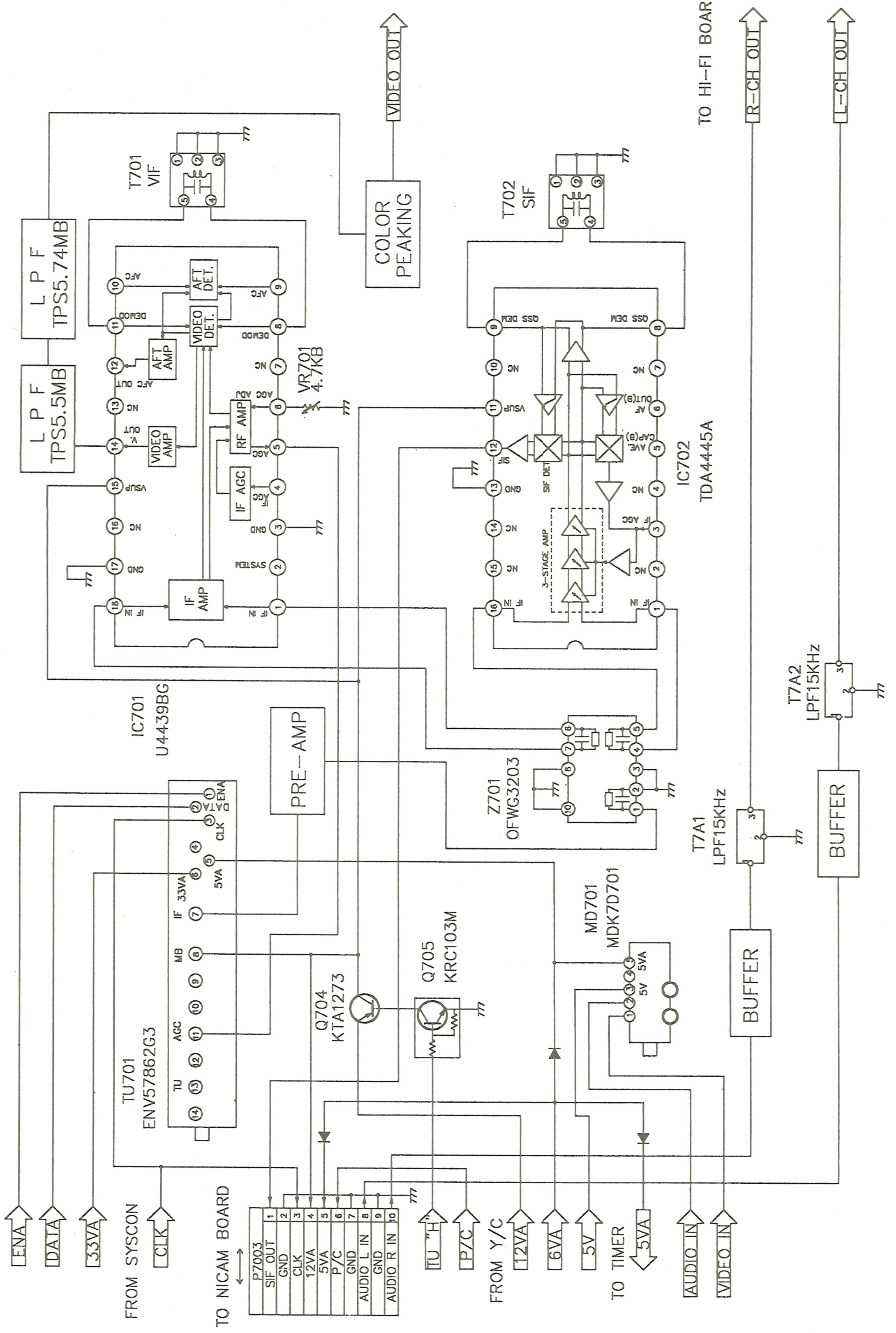
BROADCASTING SYSTEM	ADJUSTMENT MARKER FREQUENCY				
	APC	SIF	CIF	PIF	ASC
PAL, SECAM (B/G)	31.90	33.40	34.47	38.90	40.40

BLOCK DIAGRAMS

1. Power Block Diagram


REG 12VA
REG 12V
CAP, Vco 12/15V
SPE,"H"
POWER CTL
REG 6VA
REG 5V
REG 6VA
REG+33VA
REG −27VA
AC1.7V
AC1.7V
D114
Q103,106
D109
REGULATOR IC102
REGULATOR Q105 ZD104
REGULATOR IC101
REGULA -TOR IC103
REGULATOR Q101 ZD101
REGULATOR Q110 ZD103
Q104,107
Q104,105
FULL WAVE RECTIFIER D101 C133~C136
FULL WAVE RECTIFIER D102 C137~C140
FULL WAVE RECTIFIER D103~D106
HALF WAVE RECTIFIER D110,111 C119~C124
+
−
PT 101 POWER TRANS
C126
LINE FILTER
C125
AC INPUT

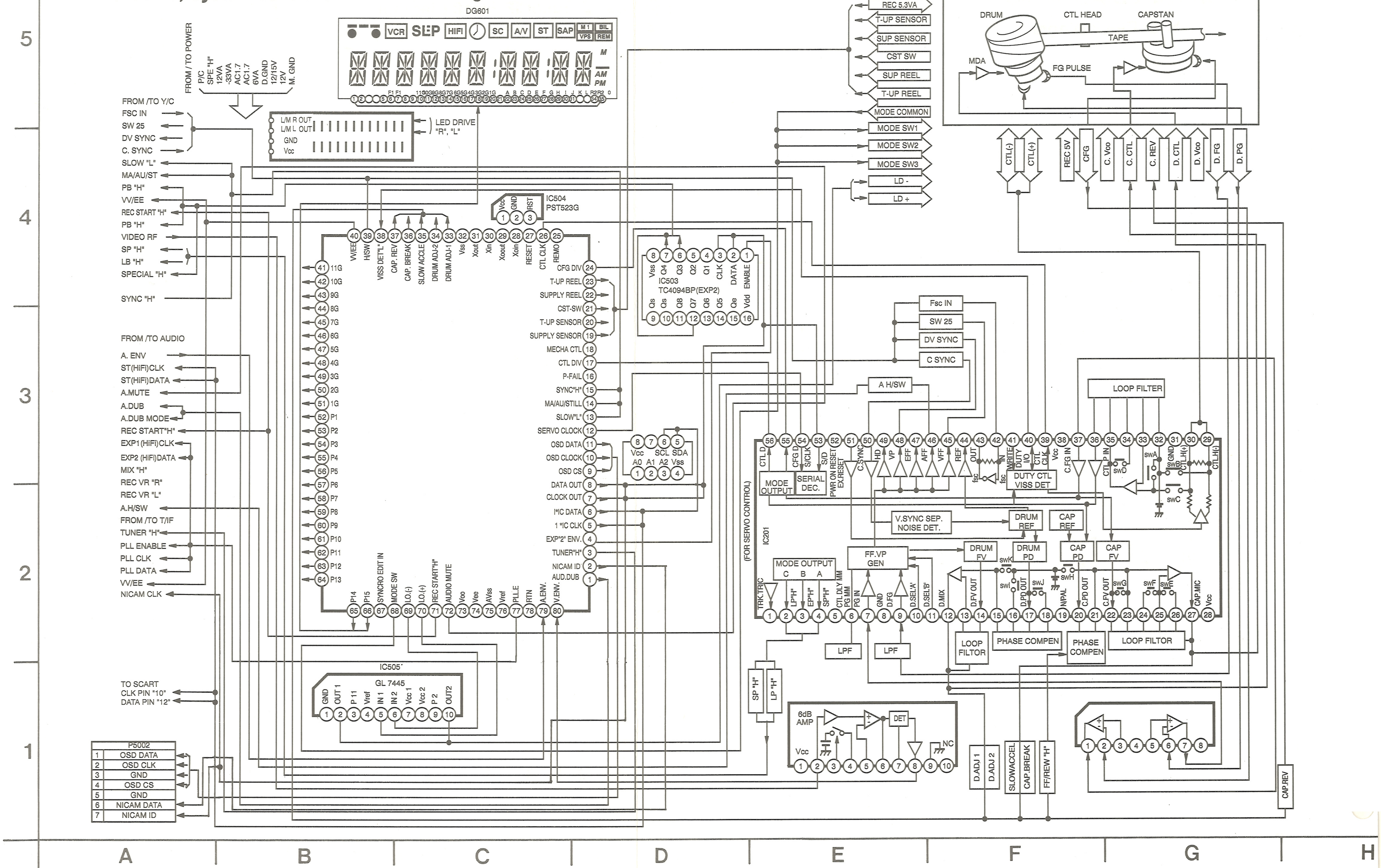
2. Tuner/IF Block Diagram


VIDEO OUT
TO HI-FI BOARD
R-CH OUT
L-CH OUT
T701 VIF
T702 SIF
COLOR PEAKING
L P F TPS5.74MB
L P F TPS5.5MB
AFT DET.
VIDEO DET.
AFT AMP
VIDEO AMP
RF AMP
IF AGC
IF AMP
VR701 4.7KB
IC701 U4439BG
IC702 TDA4445A
3-STAGE AMP
Z701 OFWG3203
T7A2 LPF15KHz
T7A1 LPF15KHz
BUFFER
BUFFER
PRE-AMP
TU701 ENV5786263
Q704 KTA1273
Q705 KRC103M
MD701 MDK7D701
ENA
DATA
CLK
33VA
5VA
IF
MB
AGC
TU
5V
FROM SYSCON
ENA
DATA
33VA
CLK
TO NICAM BOARD
P7003
SIF OUT
GND
CLK
12VA
5VA
P/C
GND
AUDIO L IN
GND
AUDIO R IN
TU "H"
P/C
FROM Y/C
12VA
6VA
5V
TO TIMER
5VA
AUDIO IN
VIDEO IN

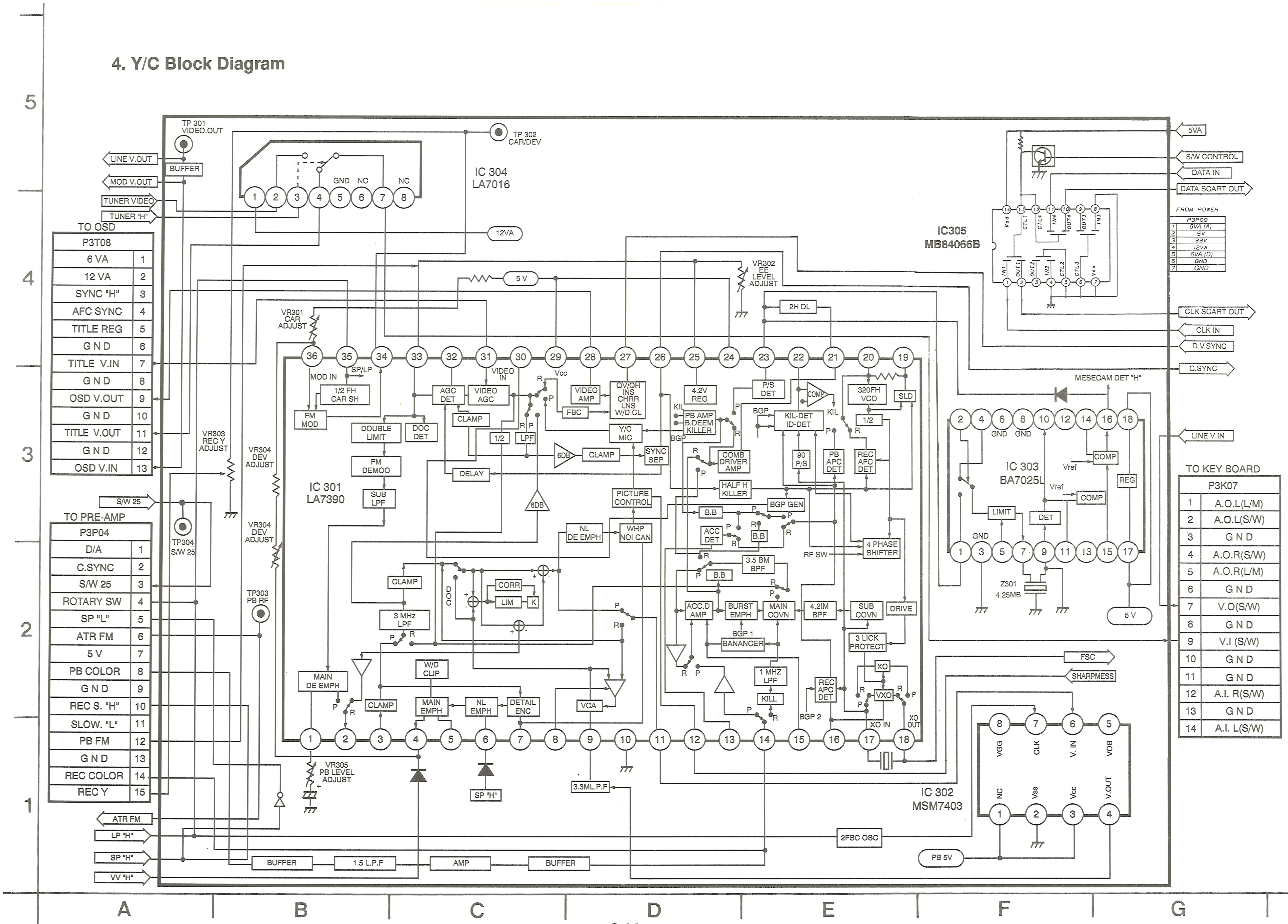
5
4
3
2
1

A B C D E F G H

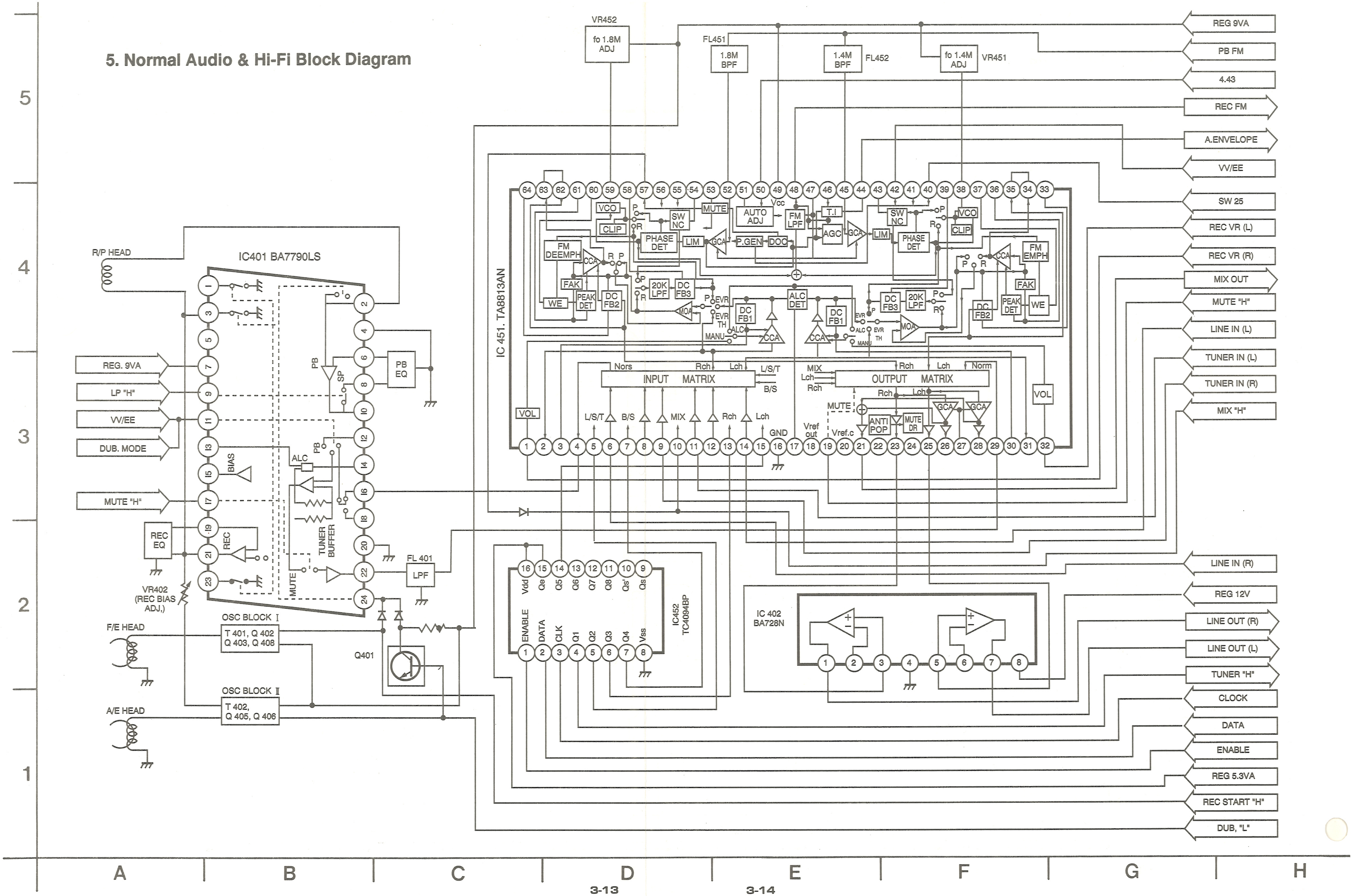
3. Servo, System Control & Timer Block Diagram


DG601
VCR
SLP
HIFI
SC
A/V
ST
SAP
M1
BIL
VPS
REM
AM
PM
FROM / TO POWER
P/C
SPE "H"
12VA
-33VA
AC1.7
AC1.7
6VA
D.GND
12/15V
12V
M. GND
FROM /TO Y/C
FSC IN
SW 25
DV SYNC
C. SYNC
SLOW "L"
MA/AU/ST
PB "H"
VV/EE
REC START "H"
PB "H"
VIDEO RF
SP "H"
LB "H"
SPECIAL "H"
SYNC "H"
FROM /TO AUDIO
A. ENV
ST(HiFi)CLK
ST(HiFi)DATA
A.MUTE
A.DUB
A.DUB MODE
REC START"H"
EXP1(HiFi)CLK
EXP2 (HiFi)DATA
MIX "H"
REC VR "R"
REC VR "L"
A.H/SW
FROM /TO T/IF
TUNER "H"
PLL ENABLE
PLL CLK
PLL DATA
VV/EE
NICAM CLK
TO SCART
CLK PIN "10"
DATA PIN "12"
P5002
1 OSD DATA
2 OSD CLK
3 GND
4 OSD CS
5 GND
6 NICAM DATA
7 NICAM ID
L/M R OUT
L/M L OUT
GND
Vcc
LED DRIVE "R", "L"
IC504 PST523G
Vcc GND RST
IC503 TC4094BP(EXP2)
IC505 GL 7445
REC 5.3VA
T-UP SENSOR
SUP SENSOR
CST SW
SUP REEL
T-UP REEL
MODE COMMON
MODE SW1
MODE SW2
MODE SW3
LD -
LD +
DRUM
CTL HEAD
CAPSTAN
TAPE
MDA
FG PULSE
CTL(-)
CTL(+)
REC 5V
CFG
C. Vco
C. CTL
C. REV
D. CTL
D. Vco
D. FG
D. PG
Fsc IN
SW 25
DV SYNC
C SYNC
A H/SW
LOOP FILTER
IC201 (FOR SERVO CONTROL)
MODE OUTPUT
SERIAL DEC.
DUTY CTL VISS DET
V.SYNC SEP. NOISE DET.
DRUM REF
CAP REF
FF.VP GEN
DRUM FV
DRUM PD
CAP PD
CAP FV
LPF
LPF
LOOP FILTER
PHASE COMPEN
PHASE COMPEN
LOOP FILTOR
SP "H"
LP "H"
6dB AMP
DET
NC
D.ADJ 1
D.ADJ 2
SLOWACCEL
CAP.BREAK
FF/REW "H"
CAP.REV
A B C D E F G H
1 2 3 4 5

4. Y/C Block Diagram

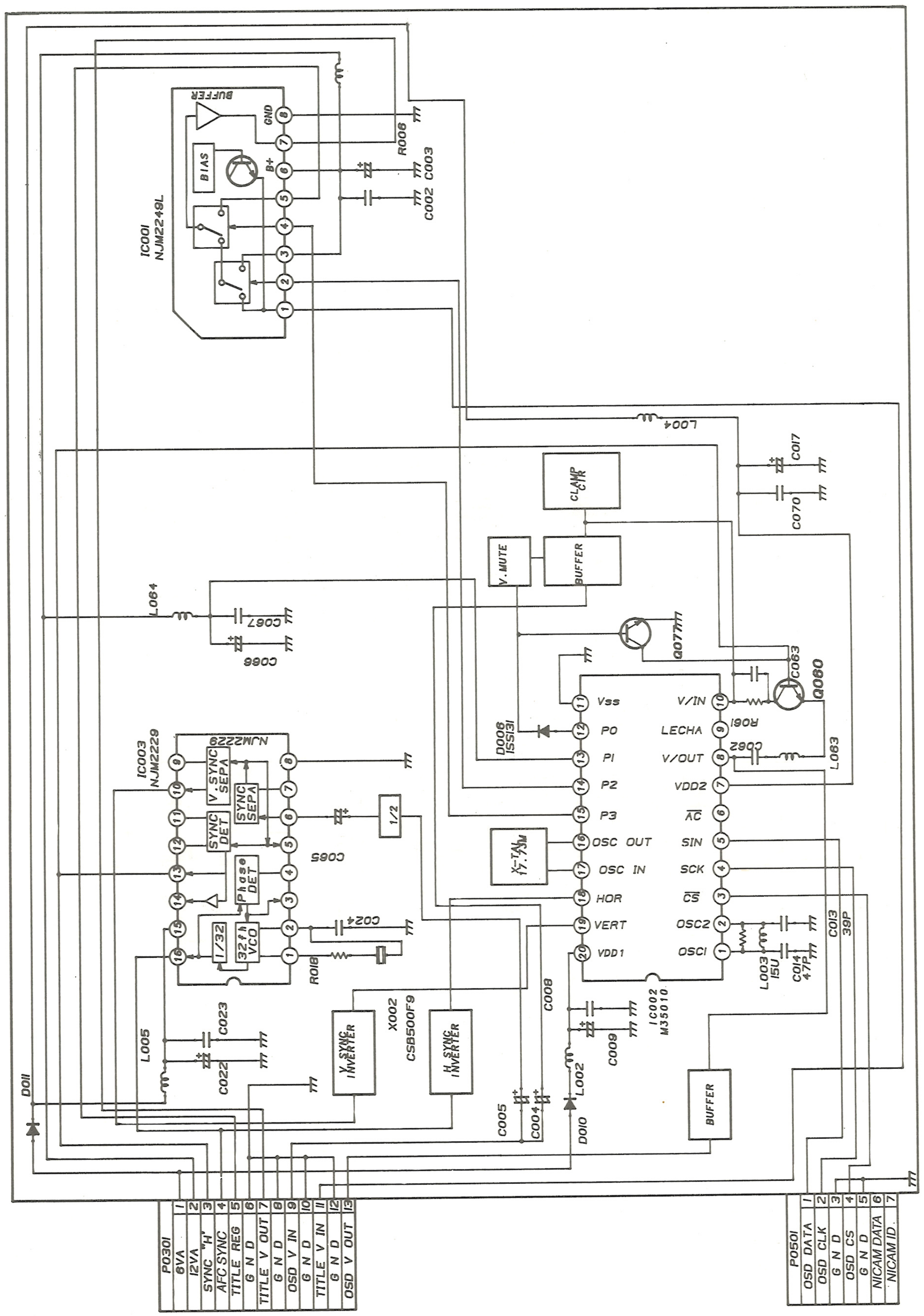

5
4
3
2
1
A
B
C
D
E
F
G
TP 301 VIDEO.OUT
TP 302 CAR/DEV
LINE V.OUT
MOD V.OUT
TUNER VIDEO
TUNER "H"
BUFFER
IC 304 LA7016
GND
NC
12VA
5 V
TO OSD
P3T08
1 6 VA
2 12 VA
3 SYNC "H"
4 AFC SYNC
5 TITLE REG
6 G N D
7 TITLE V.IN
8 G N D
9 OSD V.OUT
10 G N D
11 TITLE V.OUT
12 G N D
13 OSD V.IN
VR301 CAR ADJUST
VR302 EE LEVEL ADJUST
VR303 REC Y ADJUST
VR304 DEV ADJUST
VR305 PB LEVEL ADJUST
S/W 25
TP304 S/W 25
TP303 PB RF
TO PRE-AMP
P3P04
1 D/A
2 C.SYNC
3 S/W 25
4 ROTARY SW
5 SP "L"
6 ATR FM
7 5 V
8 PB COLOR
9 G N D
10 REC S. "H"
11 SLOW. "L"
12 PB FM
13 G N D
14 REC COLOR
15 REC Y
ATR FM
LP "H"
SP "H"
VV "H"
IC 301 LA7390
MOD IN
SP/LP
VIDEO IN
Vcc
FM MOD
1/2 FH CAR SH
AGC DET
VIDEO AGC
VIDEO AMP
QV/QH INS CHRR LNS W/D CL
4.2V REG
P/S DET
COMP
320FH VCO
SLD
DOUBLE LIMIT
DOC DET
CLAMP
FBC
Y/C MIC
PB AMP B.DEEM KILLER
KIL
KIL-DET ID-DET
BGP
1/2
FM DEMOO
LPF
6DB
SYNC SEP
COMB DRIVER AMP
90 P/S
PB APC DET
REC AFC DET
SUB LPF
DELAY
HALF H KILLER
PICTURE CONTROL
BGP GEN
B.B
ACC DET
NL DE EMPH
WHP NOI CAN
4 PHASE SHIFTER
RF SW
3.5 BM BPF
CORR
LIM
K
DOC
3 MHz LPF
ACC.D AMP
BURST EMPH
MAIN COVN
4.2IM BPF
SUB COVN
DRIVE
BGP 1
BANANCER
3 LICK PROTECT
XO
1 MHZ LPF
KILL
REC APC DET
VXO
BGP 2
XO IN
XO OUT
MAIN DE EMPH
W/D CLIP
MAIN EMPH
NL EMPH
DETAIL ENC
VCA
SP "H"
3.3ML.P.F
2H DL
2FSC OSC
PB 5V
BUFFER
1.5 L.P.F
AMP
IC 302 MSM7403
VGG
CLK
V. IN
VOB
NC
Vss
Vcc
V.OUT
FSC
SHARPMESS
5VA
S/W CONTROL
DATA IN
DATA SCART OUT
IC305 MB84066B
Vdd
CTL1
CTL4
IN4
OUT4
OUT3
IN3
IN1
OUT1
OUT2
IN2
CTL3
Vss
FROM POWER
P3P09
1 6VA (A)
2 5V
3 33V
4 12VA
5 6VA (D)
6 GND
7 GND
CLK SCART OUT
CLK IN
D.V.SYNC
C.SYNC
MESECAM DET "H"
LINE V.IN
IC 303 BA7025L
Vref
COMP
REG
LIMIT
DET
Z301 4.25MB
5 V
TO KEY BOARD
P3K07
1 A.O.L(L/M)
2 A.O.L(S/W)
3 G N D
4 A.O.R(S/W)
5 A.O.R(L/M)
6 G N D
7 V.O(S/W)
8 G N D
9 V.I (S/W)
10 G N D
11 G N D
12 A.I. R(S/W)
13 G N D
14 A.I. L(S/W)
P
R

5. Normal Audio & Hi-Fi Block Diagram

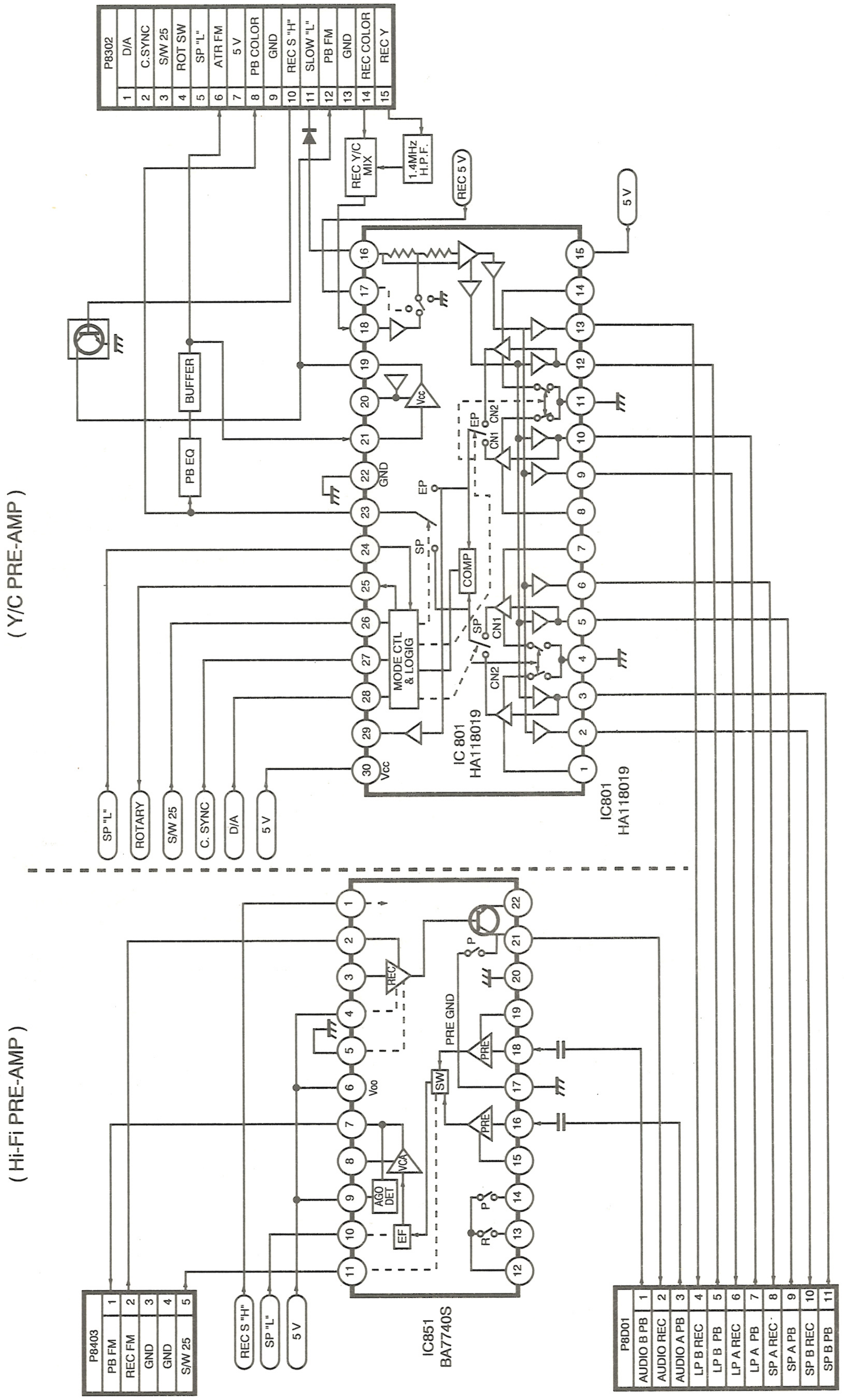


R/P HEAD
IC401 BA7790LS
REG. 9VA
LP "H"
VV/EE
DUB. MODE
MUTE "H"
REC EQ
VR402 (REC BIAS ADJ.)
F/E HEAD
A/E HEAD
OSC BLOCK I
T 401, Q 402
Q 403, Q 408
OSC BLOCK II
T 402,
Q 405, Q 406
Q401
PB EQ
PB
SP
BIAS
ALC
TUNER BUFFER
REC
MUTE
FL 401
LPF
VR452
fo 1.8M ADJ
FL451
1.8M BPF
1.4M BPF
FL452
fo 1.4M ADJ
VR451
IC 451. TA8813AN
VCO
CLIP
SW NC
PHASE DET
MUTE
AUTO ADJ
Vcc
FM LPF
T.I
AGC
GCA
LIM
P.GEN
DOC
FM DEEMPH
FM EMPH
CCA
FAK
WE
PEAK DET
DC FB2
20K LPF
DC FB3
MOA
EVR
TH
MANU
ALC
DC FB1
ALC DET
INPUT MATRIX
OUTPUT MATRIX
Nors
Norm
Rch
Lch
L/S/T
B/S
MIX
VOL
GND
Vref out
Vref.c
ANTI POP
MUTE DR
IC452 TC4094BP
Vdd
Qe
Q5
Q6
Q7
Q8
Qs'
Qs
ENABLE
DATA
CLK
Q1
Q2
Q3
Q4
Vss
IC 402 BA728N
REG 9VA
PB FM
4.43
REC FM
A.ENVELOPE
VV/EE
SW 25
REC VR (L)
REC VR (R)
MIX OUT
MUTE "H"
LINE IN (L)
TUNER IN (L)
TUNER IN (R)
MIX "H"
LINE IN (R)
REG 12V
LINE OUT (R)
LINE OUT (L)
TUNER "H"
CLOCK
DATA
ENABLE
REG 5.3VA
REC START "H"
DUB, "L"
5
4
3
2
1
A
B
C
D
E
F
G
H

6. Function OSD/Title Block Diagram


BUFFER
BIAS
GND
B+
IC001
NJM2249L
R006
C002
C003
L004
C017
C070
CLAMP CTR
V. MUTE
BUFFER
L064
C067
C066
Q077
Q080
C063
IC003
NJM2229
V. SYNC SEPA
SYNC SEPA
SYNC DET
Phase DET
1/32
32 fH VCO
1/2
C065
C024
R018
Vss
PO
PI
P2
P3
OSC OUT
OSC IN
HOR
VERT
VDD1
V/IN
LECHA
V/OUT
VDD2
AC
SIN
SCK
CS
OSC2
OSC1
R081
C082
L063
D006
1SS131
X-TAL 17.73M
L003
15U
C014
47P
C013
39P
IC002
M35010
C008
C009
X002
CSB500F9
V. SYNC INVERTER
H. SYNC INVERTER
L002
D010
C005
C004
L005
C023
C022
D011
BUFFER
P0301
1 6VA
2 12VA
3 SYNC "H"
4 AFC SYNC
5 TITLE REG
6 G N D
7 TITLE V OUT
8 G N D
9 OSD V IN
10 G N D
11 TITLE V IN
12 G N D
13 OSD V OUT
P0501
1 OSD DATA
2 OSD CLK
3 G N D
4 OSD CS
5 G N D
6 NICAM DATA
7 NICAM ID

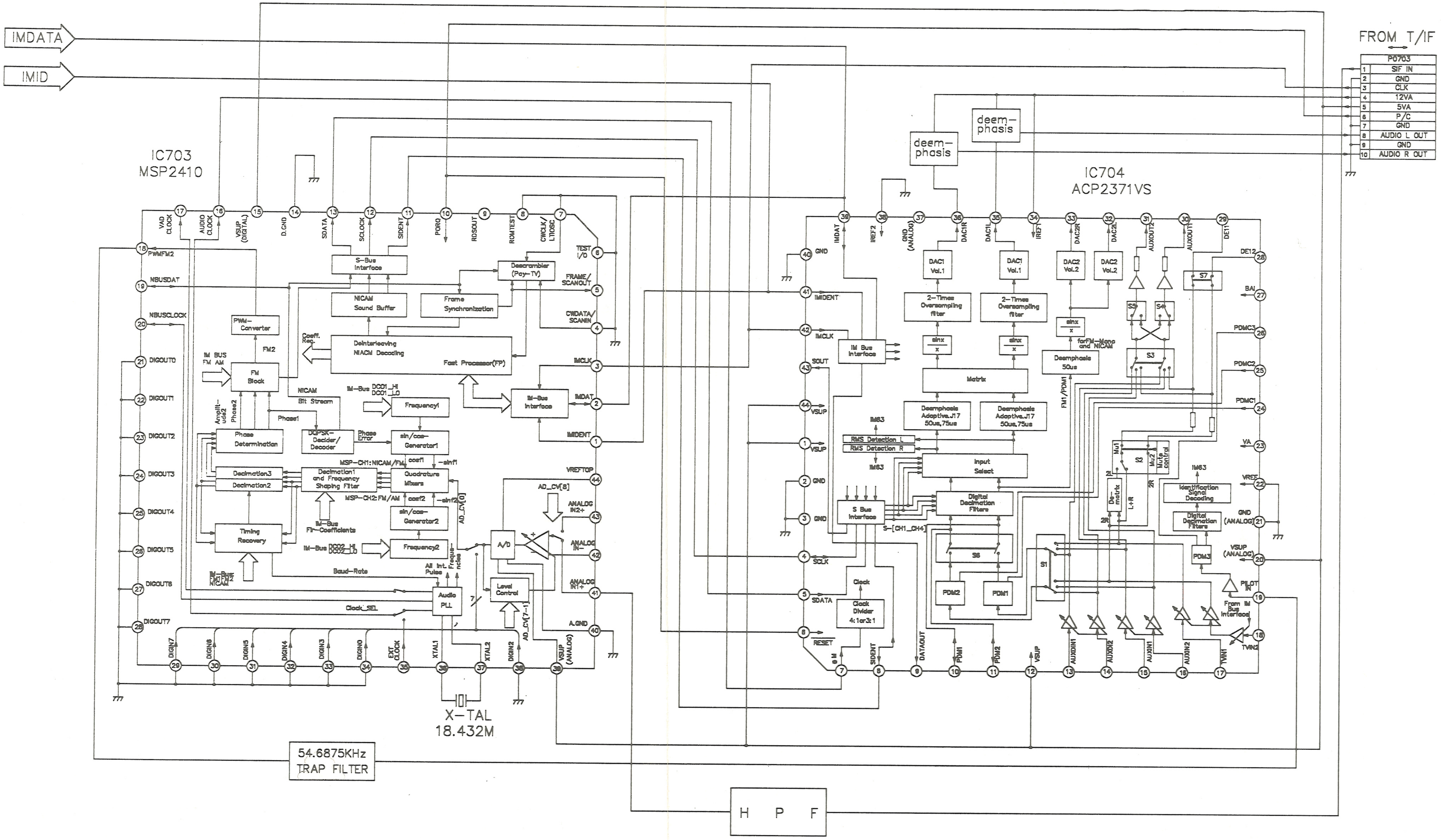
7. Pre-Amp Block Diagram


P8302
1 D/A
2 C.SYNC
3 S/W 25
4 ROT SW
5 SP "L"
6 ATR FM
7 5 V
8 PB COLOR
9 GND
10 REC S "H"
11 SLOW "L"
12 PB FM
13 GND
14 REC COLOR
15 REC Y
REC Y/C MIX
1.4MHz H.P.F.
REC 5 V
5 V
(Y/C PRE-AMP)
BUFFER
PB EQ
GND
EP
SP
CN1
CN2
COMP
MODE CTL & LOGIG
Vcc
IC 801
HA118019
IC801
HA118019
SP "L"
ROTARY
S/W 25
C. SYNC
D/A
5 V
(Hi-Fi PRE-AMP)
REC
PRE GND
PRE
SW
Vcc
VCA
AGC DET
EF
P
R
IC851
BA7740S
P8403
1 PB FM
2 REC FM
3 GND
4 GND
5 S/W 25
REC S "H"
SP "L"
5 V
P8D01
1 AUDIO B PB
2 AUDIO REC
3 AUDIO A PB
4 LP B REC
5 LP B PB
6 LP A REC
7 LP A PB
8 SP A REC
9 SP A PB
10 SP B REC
11 SP B PB

5
4
3
2
1

A B C D E F G H

8. NICAM Block Diagram

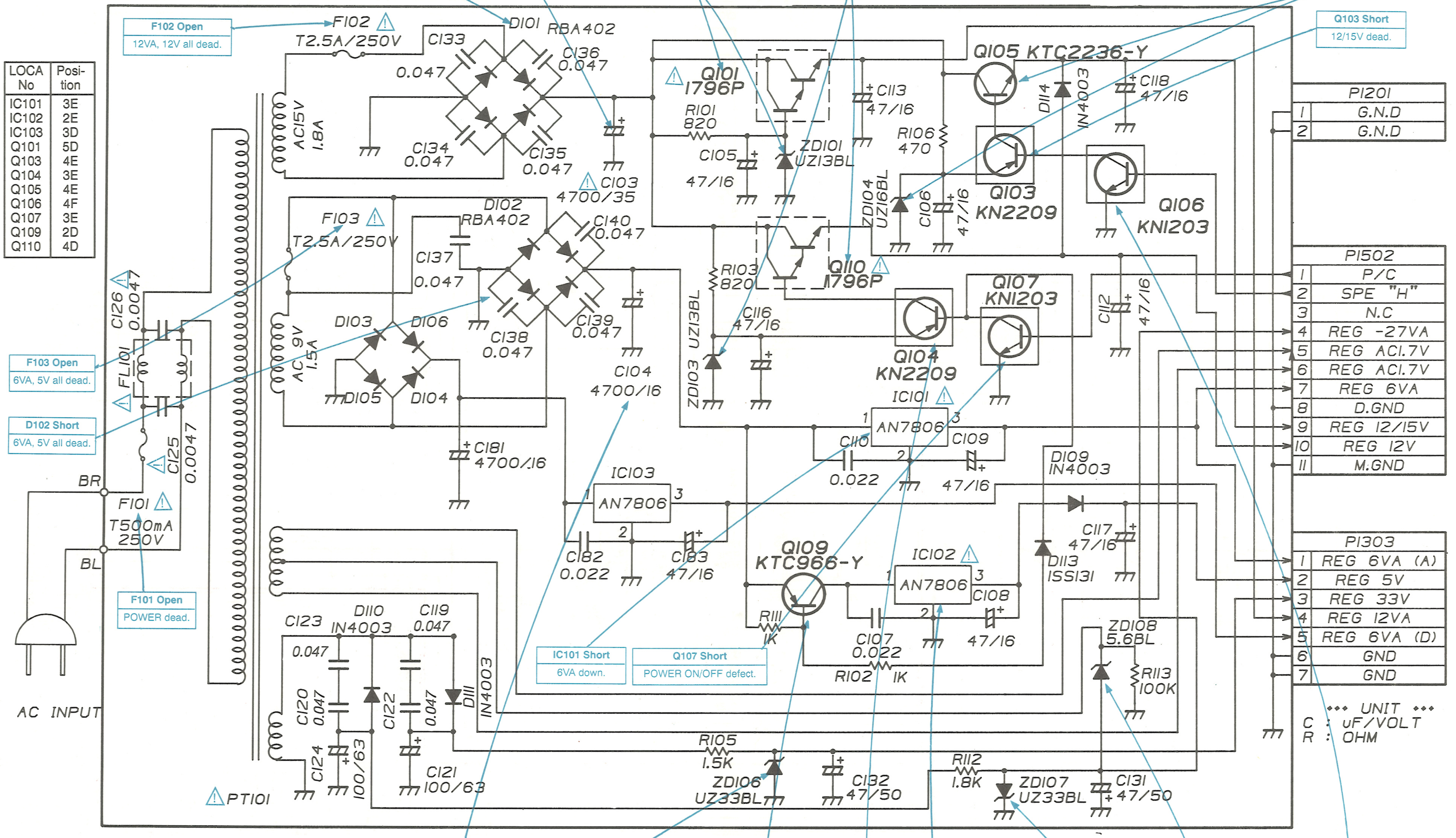

IMDATA
IMID
IC703
MSP2410
IC704
ACP2371VS
FROM T/IF
P0703
1 SIF IN
2 GND
3 CLK
4 12VA
5 5VA
6 P/C
7 GND
8 AUDIO L OUT
9 GND
10 AUDIO R OUT
deem-phasis
deem-phasis
VAD CLOCK
AUDIO CLOCK
VSUP (DIGITAL)
D.GND
SDATA
SCLOCK
SIDENT
PORO
RDSOUT
ROMTEST
CWCLK/LTIOSC
PWMFM2
NBUSDAT
NBUSCLOCK
DIGOUT0
DIGOUT1
DIGOUT2
DIGOUT3
DIGOUT4
DIGOUT5
DIGOUT6
DIGOUT7
DIGIN7
DIGIN6
DIGIN5
DIGIN4
DIGIN3
DIGIN0
EXT CLOCK
XTAL1
XTAL2
DIGIN2
VSUP (ANALOG)
A.GND
ANALOG IN1+
ANALOG IN-
ANALOG IN2+
VREFTOP
IMIDENT
IMDAT
IMCLK
CWDATA/SCANIN
FRAME/SCANOUT
TEST I/O
S-Bus Interface
Descrambler (Pay-TV)
NICAM Sound Buffer
Frame Synchronization
PWM-Converter
FM2
Deinterleaving NIACM Decoding
Fast Processor(FP)
Coeff. Req.
IM BUS FM AM
FM Block
NICAM Bit Stream
IM-Bus DCO1_HI DCO1_LO
Frequency1
IM-Bus Interface
Amplitude2
Phase2
Phase1
Phase Determination
DQPSK-Decider/Decoder
Phase Error
sin/cos-Generator1
MSP-CH1: NICAM/FM
coef1
-sinf1
Decimation3
Decimation2
Decimation1 and Frequency Shaping Filter
Quadrature Mixers
MSP-CH2: FM/AM
coef2
-sinf2
AD_CV[0]
AD_CV[8]
sin/cos-Generator2
IM-Bus Fir-Coefficients
Timing Recovery
IM-Bus DCO2_HI DCO2_LO
Frequency2
All Int. Pulses
Frequencies
Baud-Rate
IM-Bus FM1/FM2 NICAM
Clock_SEL
Audio PLL
A/D
Level Control
AD_CV[7-1]
X-TAL 18.432M
54.6875KHz TRAP FILTER
H P F
IMDAT
IREF2
GND (ANALOG)
DAC1R
DAC1L
IREF1
DAC2R
DAC2L
AUXOUT2
AUXOUT1
DE11
DE12
BAI
PDMC3
PDMC2
PDMC1
VA
VREF
GND (ANALOG)
VSUP (ANALOG)
PILOT IN
TVIN2
GND
IMIDENT
IMCLK
SOUT
VSUP
VSUP
GND
GND
SCLK
SDATA
RESET
φM
SIDENT
DATAOUT
PDM1
PDM2
VSUP
AUXIN1
AUXIN2
AUXIN1
AUXIN2
TVIN1
DAC1 Vol.1
DAC1 Vol.1
DAC2 Vol.2
DAC2 Vol.2
2-Times Oversampling filter
2-Times Oversampling filter
sinx/x
sinx/x
sinx/x
forFM-Mono and NICAM
Deemphasis 50us
FM1/PDM1
Matrix
Deemphasis Adaptive J17 50us,75us
Deemphasis Adaptive J17 50us,75us
IM Bus Interface
IM63
RMS Detection L
RMS Detection R
Input Select
S Bus Interface
S-[CH1_CH4]
Digital Decimation Filters
S6
S1
S2
S3
S4
S5
S7
Mu1
Mu2
Mute control
De-matrix
2L
2R
L+R
Identification Signal Decoding
Digital Decimation Filters
PDM3
PDM2
PDM1
Clock
Clock Divider 4:1or3:1
From IM Bus Interface
1
2
3
4
5
A
B
C
D
E
F
G
H

CIRCUIT DIAGRAMS

1. Power Circuit Diagram

Note: The components identified by mark ⚠ are critical for safety.
Replace only with part number specified.

LOCA No	Posi-tion
IC101	3E
IC102	2E
IC103	3D
Q101	5D
Q103	4E
Q104	3E
Q105	4E
Q106	4F
Q107	3E
Q109	2D
Q110	4D



D101 Short 12V, 12VA all dead.

C103 Short F102 open.

Q101 Short, ZD101 Short 12VA dead & F102 open

Q110 Short, ZD103 Short 12V dead & F102 open

Q105 & ZD104 Short 12/15V dead & F102 open

Q103 Short 12/15V dead.

F102 Open 12VA, 12V all dead.

F103 Open 6VA, 5V all dead.

D102 Short 6VA, 5V all dead.

F101 Open POWER dead.

IC101 Short 6VA down.

Q107 Short POWER ON/OFF defect.

C104 Short F103 open.

ZD106 Short Tuning is failed.

Q109 Short 5V dead

Q104 Short 12V dead.

IC102 Short 5V down

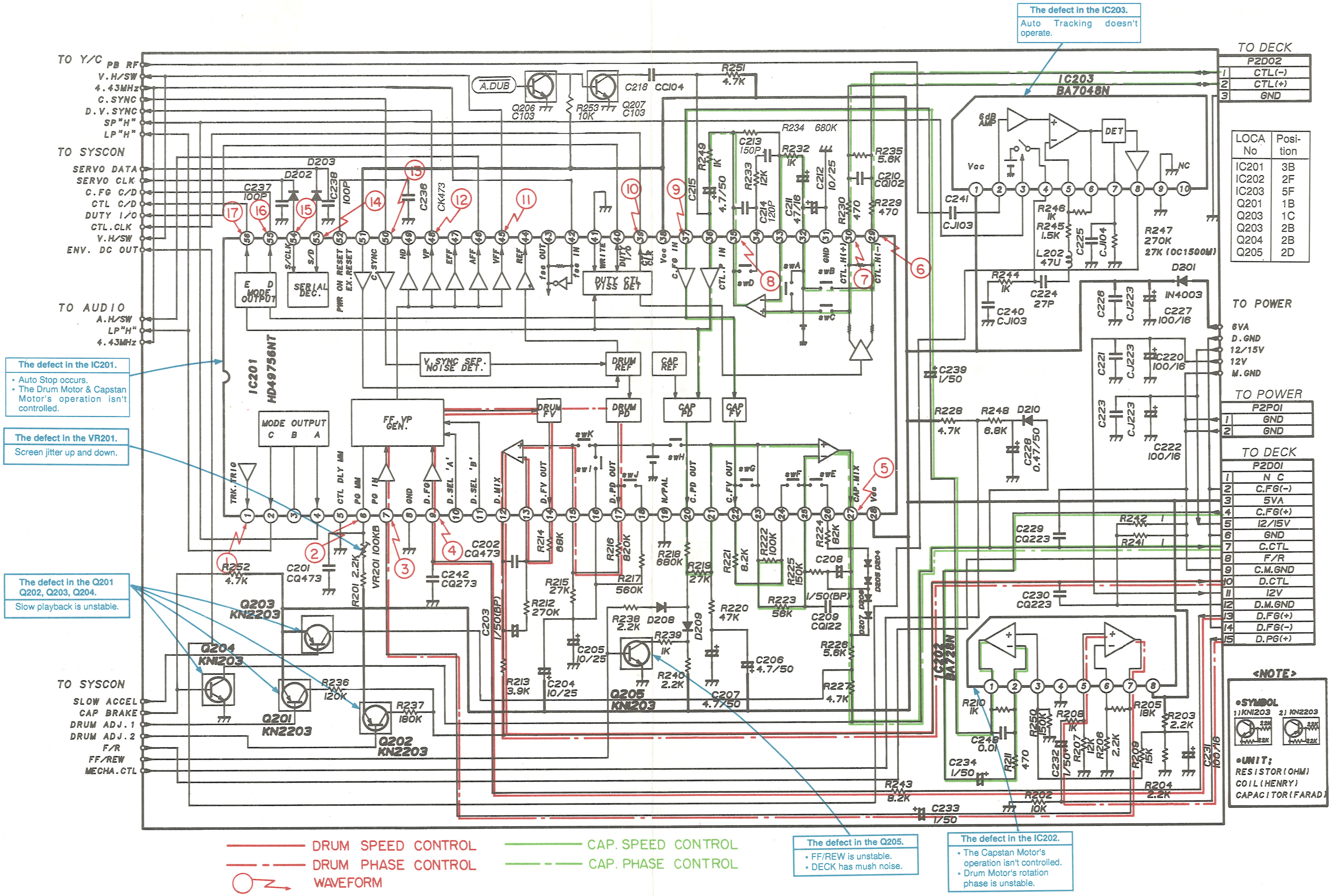
ZD107 Short Digitron power dead.

ZD108 Short The Digitron's light is weak.

Q106 Short Z-search defect.

F102 ⚠ T2.5A/250V
D101 RBA402
C133 0.047
C134 0.047
C135 0.047
C136 0.047
C103 4700/35
AC15V 1.8A
F103 ⚠ T2.5A/250V
D102 RBA402
C137 0.047
C140 0.047
C138 0.047
C139 0.047
C104 4700/16
AC 9V 1.5A
D103
D104
D105
D106
C181 4700/16
C126 0.0047
C125 0.0047
FL101
BR
BL
F101 ⚠ T500mA 250V
AC INPUT
⚠PT101
C123 0.047
C120 0.047
C122 0.047
C124 100/63
C121 100/63
C119 0.047
D110 IN4003
D111 IN4003
Q101 1796P
R101 820
C105 47/16
ZD101 UZ13BL
C113 47/16
R106 470
Q110 1796P
R103 820
C116 47/16
ZD103 UZ13BL
Q105 KTC2236-Y
D114 IN4003
C118 47/16
Q103 KN2209
ZD104 UZ16BL
C106 47/16
Q106 KN1203
Q107 KN1203
Q104 KN2209
C112 47/16
IC101 ⚠ AN7806
C110 0.022
C109 47/16
IC103 AN7806
C182 0.022
C183 47/16
Q109 KTC966-Y
R111 1K
IC102 ⚠ AN7806
C107 0.022
C108 47/16
R102 1K
D109 IN4003
D113 ISS131
C117 47/16
ZD108 5.6BL
R113 100K
R105 1.5K
ZD106 UZ33BL
C132 47/50
R112 1.8K
ZD107 UZ33BL
C131 47/50
P1201
1 G.N.D
2 G.N.D
P1502
1 P/C
2 SPE "H"
3 N.C
4 REG -27VA
5 REG AC1.7V
6 REG AC1.7V
7 REG 6VA
8 D.GND
9 REG 12/15V
10 REG 12V
11 M.GND
P1303
1 REG 6VA (A)
2 REG 5V
3 REG 33V
4 REG 12VA
5 REG 6VA (D)
6 GND
7 GND
••• UNIT •••
C : uF/VOLT
R : OHM
5
4
3
2
1
A
B
C
D
E
F
G

2. Servo Circuit Diagram


TO Y/C
PB RF
V.H/SW
4.43MHz
C.SYNC
D.V.SYNC
SP"H"
LP"H"
TO SYSCON
SERVO DATA
SERVO CLK
C.FG C/D
CTL C/D
DUTY I/O
CTL.CLK
V.H/SW
ENV. DC OUT
TO AUDIO
A.H/SW
LP"H"
4.43MHz
TO SYSCON
SLOW ACCEL
CAP BRAKE
DRUM ADJ.1
DRUM ADJ.2
F/R
FF/REW
MECHA.CTL
IC201
HD49756NT
IC203
BA7048N
IC202
BA728N
A.DUB
Q206 C103
Q207 C103
R253 10K
C218 CC104
R251 4.7K
Q203 KN2203
Q204 KN1203
Q201 KN2203
Q202 KN2203
Q205 KN1203
R236 120K
R237 180K
R252 4.7K
C201 CQ473
R201 2.2K
VR201 100KB
C202 CQ473
C242 CQ273
C203 1/50(BP)
R213 3.9K
C204 10/25
R214 68K
R215 27K
R212 270K
R216 820K
R217 560K
R218 680K
R219 27K
R238 2.2K
D208
C205 10/25
R239 1K
R240 2.2K
D209
C207 4.7/50
C206 4.7/50
R220 47K
R221 8.2K
R222 100K
R225 150K
R223 56K
R224 82K
C208
C209 CQ122
D205 D206 D207
R226 5.6K
R227 4.7K
D203 D202
C237 100P
C238 100P
C236 CK473
C215
R249 1K
C213 150P
R233 12K
C214 120P
R234 680K
R232 1K
C211 47/16
C212 10/25
R230 470
R235 5.6K
C210 CQ102
R229 470
C241 CJ103
R246 1K
R245 1.5K
L202 47U
C225
CJ104
R247 270K
27K (QC1500M)
R244 1K
C224 27P
C240 CJ103
D201 IN4003
C226 CJ223
C227 100/16
C221 CJ223
C220 100/16
C239 1/50
R228 4.7K
R248 6.8K
D210
C228 0.47/50
C223 CJ223
C222 100/16
C229 CQ223
R242
R241
C230 CQ223
R210 1K
C248 0.01
C234 1/50
R211 4K
R250 150K
R207 150K
R208 1K
R206 12K
R209 15K
R205 18K
R203 2.2K
C232 1/50
C231 100/16
R204 2.2K
R243 8.2K
R202 10K
C233 1/50
6dB AMP
DET
Vcc
NC
MODE OUTPUT
SERIAL DEC.
MODE OUTPUT C B A
FF, VP GEN.
V.SYNC SEP. NOISE DET.
DRUM REF
CAP REF
DRUM FV
DRUM PD
CAP PD
CAP FV
DUTY CTL VISS DET
TO DECK
P2D02
CTL(-)
CTL(+)
GND
TO POWER
6VA
D.GND
12/15V
12V
M.GND
TO POWER
P2P01
GND
GND
TO DECK
P2D01
N C
C.FG(-)
5VA
C.FG(+)
12/15V
GND
C.CTL
F/R
C.M.GND
D.CTL
12V
D.M.GND
D.FG(+)
D.FG(-)
D.PG(+)
①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪
⑫
⑬
⑭
⑮
⑯
⑰

LOCA No	Position
IC201	3B
IC202	2F
IC203	5F
Q201	1B
Q203	1C
Q203	2B
Q204	2B
Q205	2D

The defect in the IC203.
Auto Tracking doesn't operate.

The defect in the IC201.
- Auto Stop occurs.
- The Drum Motor & Capstan Motor's operation isn't controlled.

The defect in the VR201.
Screen jitter up and down.

The defect in the Q201 Q202, Q203, Q204.
Slow playback is unstable.

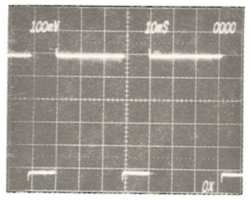
The defect in the Q205.
- FF/REW is unstable.
- DECK has mush noise.

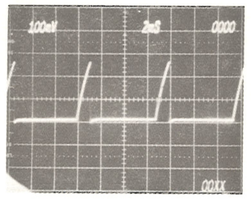
The defect in the IC202.
- The Capstan Motor's operation isn't controlled.
- Drum Motor's rotation phase is unstable.

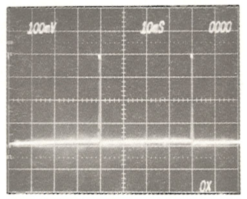
<NOTE>
•SYMBOL
1) KN1203 2) KN2203
•UNIT;
RESISTOR(OHM)
COIL(HENRY)
CAPACITOR(FARAD)

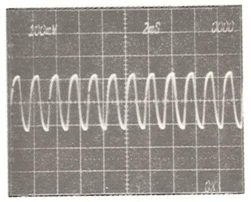
DRUM SPEED CONTROL
DRUM PHASE CONTROL
WAVEFORM
CAP. SPEED CONTROL
CAP. PHASE CONTROL

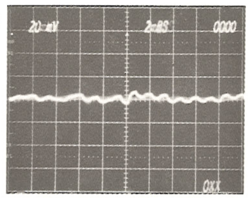
* Servo Waveform

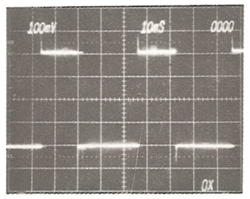
①

IC201 Pin ①
Tracking Trigger
(100mV/10msec)

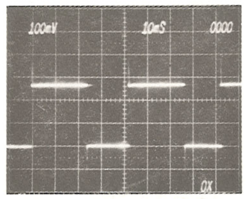
②

IC201 Pin ⑥
PG Mono-Multi
(100mV/2msec)

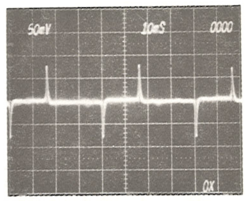
③

IC201 Pin ⑦ PG Input
(100mV/10msec)

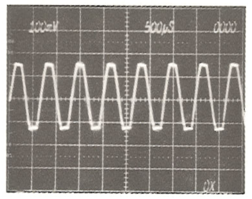
④

IC201 Pin ⑨ Drum
Frequency Generator
Input (100mV/2msec)

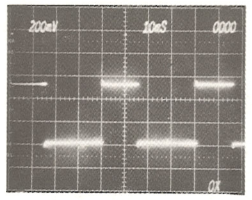
⑤

IC201 Pin ㉗ Capstan Control
(20mV/2msec)

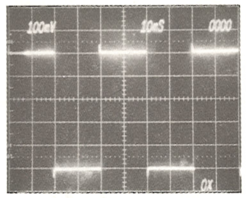
⑥

IC201 Pin ㉙
Record Control (-)
(100mV/10msec)

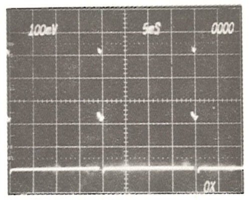
⑦

IC201 Pin ㉚
Record Control (+)
(100mV/10msec)

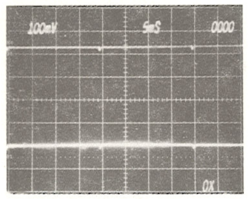
⑧

IC201 Pin ㉟
Playback Control Pulse
(50mV/10msec)

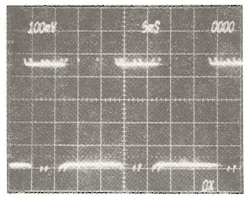
⑨

IC201 Pin ㊲
Capstan Frequency Generator
Input (100mV/500μ sec)

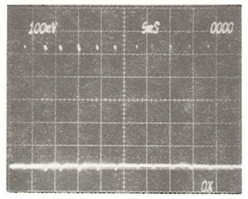
⑩

IC201 Pin ㊴ Control Clock
(200mV/10msec)

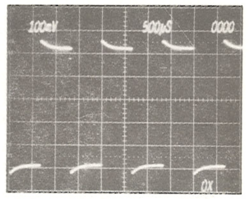
⑪

IC201 Pin ㊺
Video Head Switching
Pulse (100mV/10msec)

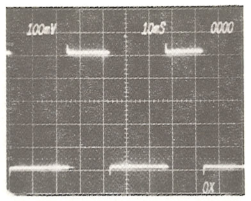
⑫

IC201 Pin ㊽ Vertical Pulse (VP)
(100mV/5msec)

⑬

IC201 Pin ㊿ C-SYNC
Input terminal
(100mV/5msec)

⑭

IC201 Pin (53)
Servo Data Input terminal

⑮

IC201 PIN (54) Servo Clock Input
terminal (100mV/5msec)

⑯

IC201 Pin (55) CFG (Capstan
Frequency Generator) Count
Down Output terminal
(100mV/500μ sec)

⑰

IC201 Pin (56) Control Count Down
Output terminal.
(100mV/10msec)

* Servo TR Voltage Sheet

(PB/REC mode)

Port / TR No.	Emitter	Collector	Base
Q201	5.10/5.09	1.21/1.20	5.01/5.01
Q202	5.10/5.09	1.20/1.20	5.01/5.02
Q203	5.10/5.09	2.73/2.73	5.01/5.02
Q204	0.01/0.01	2.75/2.75	0.01/0
Q205	0/0.01	5.09/5.09	0.01/0
Q206	0/0	0.01/0.01	3.5/3.5
Q207	0/0	5.09/5.09	0.01/0.01

* Servo IC Voltage Sheet

PB(REC)

1.95 (5.07)	2.55 (2.55)	0.75 (0.75)	2.25 (2.25)	5.06 (5.03)	5.10 (5.09)	0.12 (0.52)	0.03 (0.04)	0.01 (0.01)	2.55 (2.55)	2.56 (0.01)	2.56 (2.55)	2.64 (2.63)	2.63 (2.63)	2.63 (2.63)	5.08 (5.07)	5.08 (5.07)	1.98 (3.68)	5.10 (5.09)	2.71 (2.71)	2.53 (2.53)	2.55 (2.55)	2.55 (2.55)	2.55 (2.55)	2.55 (2.55)	0 (0.01)	2.55 (2.80)	0.01 (2.14)

55 50 45 40 35 30

IC201(HD49756NT)

1 5 10 15 20 25

3.68 (3.68)	0.01 (0.01)	0.01 (0.01)	5.04 (5.04)	0.01 (0)	0.29 (0.02)	2.11 (2.11)	0 (0.01)	2.67 (2.67)	2.67 (2.67)	2.68 (2.68)	1.32 (1.32)	2.55 (2.55)	2.56 (2.68)	2.57 (2.56)	2.56 (2.55)	2.56 (2.58)	2.42 (2.42)	0 (0.01)	2.58 (2.58)	2.58 (2.57)	2.58 (2.57)	2.58 (2.57)	2.58 (2.57)	2.57 (2.57)	2.67 (2.67)	2.70 (2.67)	5.10 (5.10)

PB(REC)

IC 202 (BA728N)

1 5

2.31 (2.31)	2.30 (2.30)	2.30 (2.30)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.11 (0.11)	5.10 (5.10)

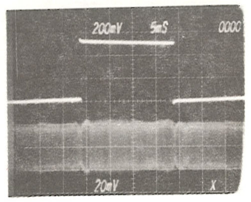
PB(REC)

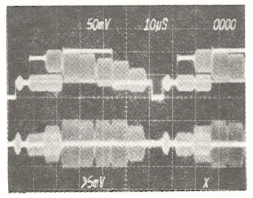
IC 203 (BA7048N)

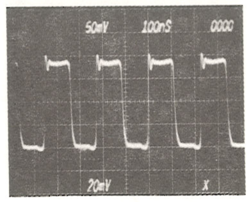
1 5 10

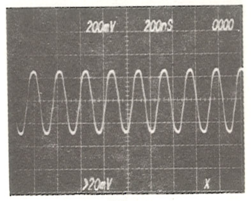
5.10 (5.09)	1.68 (1.68)	5.04 (5.04)	0.01 (0.02)	2.53 (2.54)	2.67 (2.54)	1.09 (0.21)	2.32 (0.17)	0 (0)	0 (0)

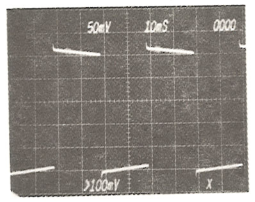
* Y/C Waveform (When taking a photograph of waveform, set probe of oscilloscope to 10:1)

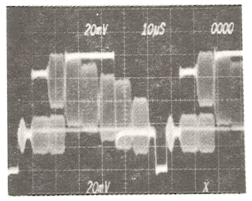
①

TP303
Playback RF (SP mode)
(20mV/5msec)

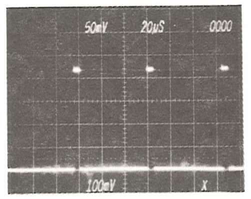
②

IC301 Pin ⑭
Playback Color
(5mV/10μ sec)

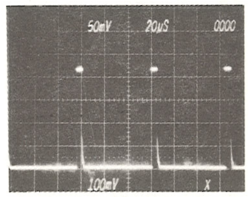
③

IC301 Pin ⑱
Playback Mode : Fsc
Oscillation (20mV/100nsec)

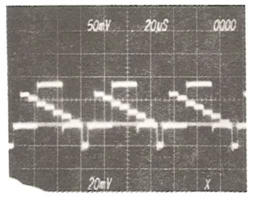
③

IC301 Pin ⑱
Record Mode:Fsc
Oscillation (20mV/200nsec)

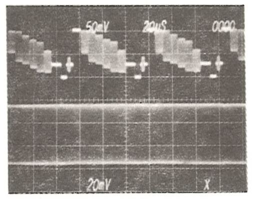
④

TP304
S/W 25 (100mV/10msec)

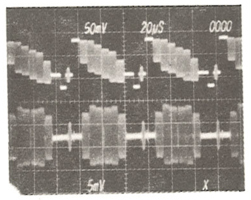
⑤

TP301 (W713)
Video Out terminal
(20mV/10μ sec)

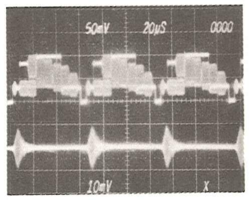
⑥

IC301 Pin ㉖ C.SYNC
(100mV/20μ sec))

⑦

IC301 Pin ㉚
B.G.P Out terminal
(100mV/20μ sec)

⑧

IC301 Pin ③
Clamp Input terminal
(20mV /20μ sec)

⑨

P3P04 Pin ⑮
Record FM signal
(20mV/20μ sec)

⑩

P3P04 Pin ⑭
Record Color Signal
(5mV/20μ sec)

⑪

IC303 Pin ⑨
Color Burst signal
(10mV/20μ sec)

* Y/C TR Voltage Sheet

(PB/REC mode)

Port / TR No.	Emitter	Collector	Base	Remark
Q301	0/0	0/0	0.02/0.01	SP mode
	0/0	0/0	5.05/5.05	LP mode
Q302	0/0	0/0	0/0	SP mode
	0/0	0/0	5.05/5.05	LP mode
Q303	0/0	0/0	4.96/0	
Q304	3.39/3.03	0/0	2.78/2.41	
Q305	4.0/3.64	0/0	2.78/3.03	
Q306	0/0	0/0	5.04/0	
Q307	0/0	4.55/4.54	0.12/0.11	
Q308	1.17/0	5.05/0	1.78/0	
Q309	2.79/0	5.03/0	3.40/0	
Q310	0.89/0	1.56/0	1.51/0	
Q311	0.95/0	5.03/0	1.56/0	
Q312	0/0	0/5.1	5.09/0	
Q313	5.11/5.1	5.05/0	4.32/5.1	
Q314	1.0/0.63	0/0	0.39/0	
Q315	2.01/0	0/0	1.38/0	
Q316	2.8/0	5.01/0	3.41/0	
Q317	3.75/3.74	0/0	3.06/3.05	
Q318	0/0	0/0	4.94/4.96	
Q321	0/0	0/0	5.01/5.01	SP mode
	0/0	5.11/5.1	0/0	LP mode

* Y/C IC Voltage Sheet

PB(REC)

8.51 (0)	2.60 (0)	2.12 (0)	2.05 (0.2)

5
IC 302
(MSM7403)
1

5.01 (0)	0 (0)	5.01 (0)	3.42 (0)

PAL mode PB(REC)

5.1 (5.09)	5.1 (5.09)	0 (0)	0 (0)	0 (0)	3.65 (3.76)	0 (0)	3.65 (3.76)	0 (0)

15 10
IC 303 (BA7025L)
1 5

3.7 (3.68)	0 (0)	0 (0)	3.7 (3.68)	4.56 (4.55)	0 (0)	4.54 (4.51)	0 (0)	3.1 (3.1)

MESECAM mode PB(REC)

5.1 (5.09)	5.1 (5.09)	4.44 (4.43)	0 (0)	4.26 (4.26)	3.58 (3.59)	4.33 (4.32)	3.57 (3.57)	0 (0)

15 10
IC 303 (BA7025L)
1 5

3.7 (3.69)	0 (0)	0 (0)	3.7 (3.69)	4.55 (4.54)	0 (0)	4.56 (4.54)	0 (0)	3.1 (3.1)

* Y/C IC Voltage Sheet

PAL mode PB(REC)

2.38 (2.41)	0.63 (0.63)	3.63 (3.21)	3.37 (3.37)	1.44 (1.40)	3.21 (3.21)	0.57 (0)	4.96 (4.99)	2.05 (2.02)	0 (0)	0.53 (0.51)	4.19 (4.19)	4.96 (4.95)	1.96 (1.96)	1.98 (1.99)	2.69 (2.54)	3.20 (3.20)	3.19 (3.19)

2.45 : PB
(2.44):(REC)
MESECAM mode
30 25 20
PB : 3.94
(REC): (3.93)
MESECAM mode
IC 301 (LA7390)
1 5 10 15

2.32 (0)	2.79 (2.42)	2.48 (2.75)	4.44 (2.68)	4.43 (2.68)	4.50 (4.49)	2.39 (2.29)	3.16 (2.25)	2.13 (2.13)	0 (0)	2.05 (2.09)	2.51 (2.53)	1.73 (1.69)	2.96 (2.97)	2.27 (2.55)	2.18 (2.19)	3.65 (3.66)	2.55 (3.26)

PB(REC)

IC 304 (LA7016)
1 5

11.7 (11.6)	7.64 (7.58)	0 (0)	6.96 (6.9)	0 (0)	0 (0)	7.6 (7.54)	0 (0)

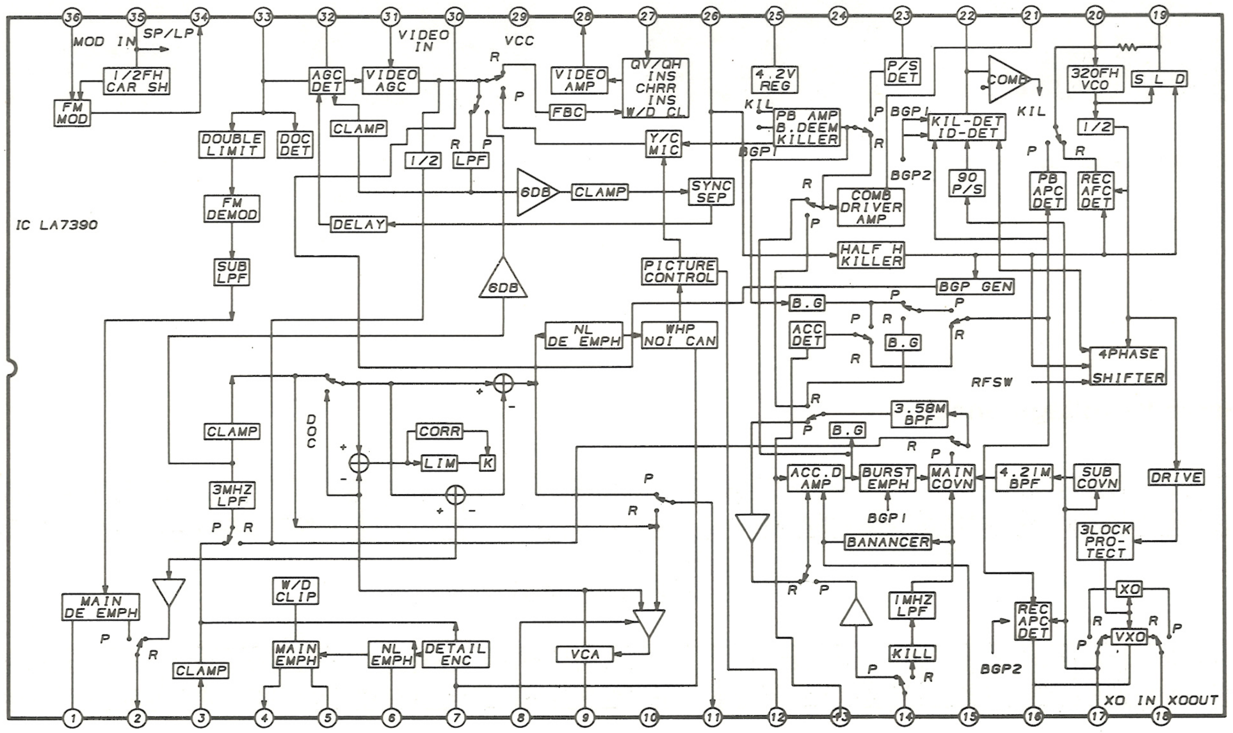
EE mode

4.87	0	0	5.06	0.34	0.35	0

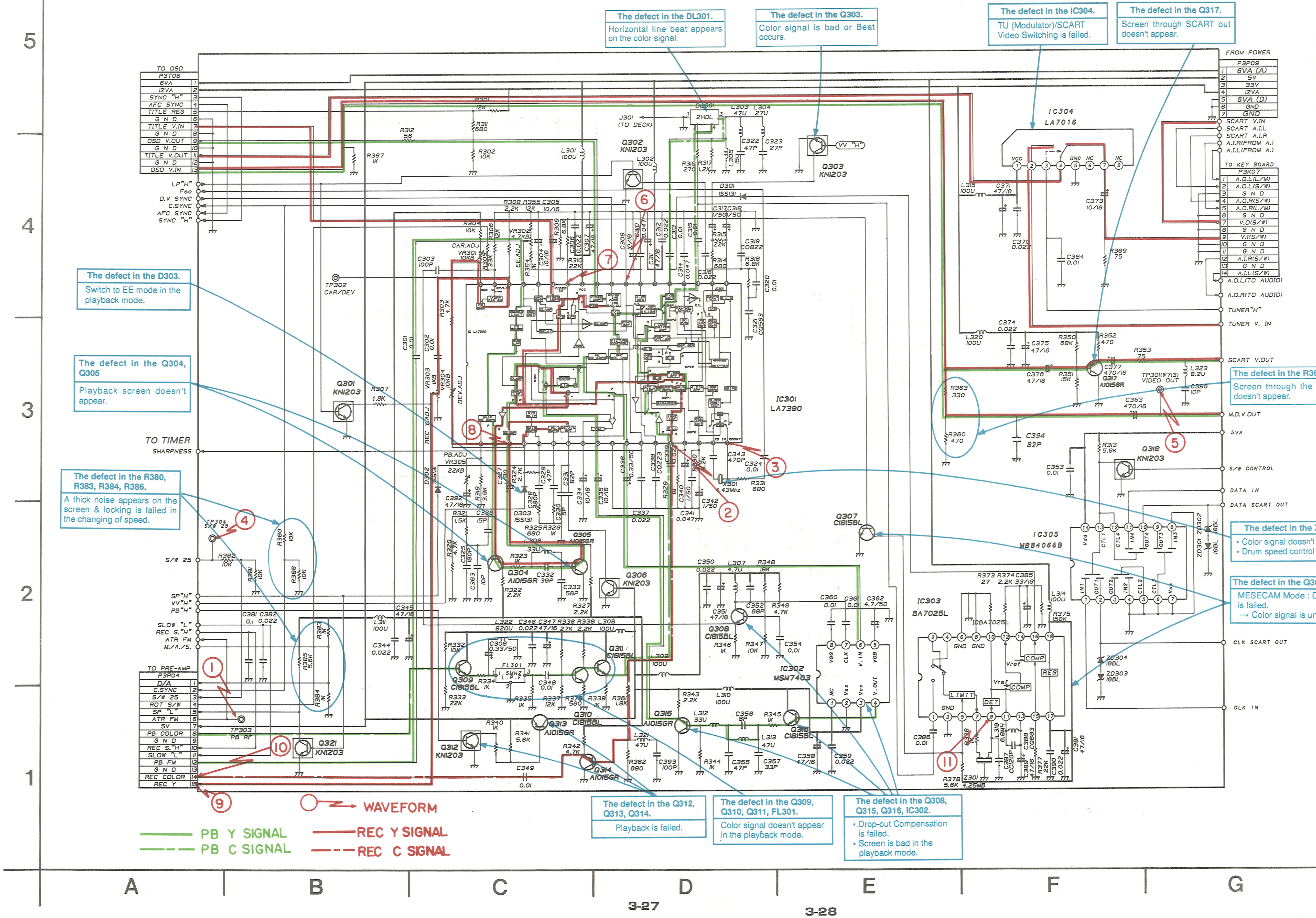
10
IC305(MB84066B)
1 5

5.06	0.35	0.35	0	0	0	0

* IC301 (LA7390) Block Diagram


MOD IN
SP/LP
1/2FH CAR SH
FM MOD
VIDEO IN
AGC DET
VIDEO AGC
VCC
VIDEO AMP
QV/QH INS CHRR INS W/D CL
FBC
4.2V REG
PB AMP B.DEEM KILLER
P/S DET
COMP
320FH VCO
S L D
KIL-DET ID-DET
KIL
1/2
DOUBLE LIMIT
DOC DET
CLAMP
1/2
LPF
Y/C MIC
BGP1
6DB
CLAMP
SYNC SEP
COMB DRIVER AMP
BGP2
90 P/S
PB APC DET
REC AFC DET
FM DEMOD
DELAY
IC LA7390
SUB LPF
6DB
PICTURE CONTROL
HALF H KILLER
BGP GEN
B.G
NL DE EMPH
WHP NOI CAN
ACC DET
B.G
4PHASE SHIFTER
RFSW
CLAMP
DOC
CORR
LIM
K
3.58M BPF
B.G
3MHZ LPF
ACC.D AMP
BURST EMPH
MAIN COVN
4.21M BPF
SUB COVN
DRIVE
BANANCER
3LOCK PRO-TECT
MAIN DE EMPH
W/D CLIP
1MHZ LPF
XO
REC APC DET
VXO
CLAMP
MAIN EMPH
NL EMPH
DETAIL ENC
VCA
KILL
BGP2
XO IN
XOOUT

3. Y/C Circuit Diagram



5
4
3
2
1
A
B
C
D
E
F
G
TO OSD
P3T08
TO TIMER
SHARPNESS
TO PRE-AMP
P3P04
FROM POWER
P3P09
TO KEY BOARD
P3K07
IC301
LA7390
IC302
MSM7403
IC303
BA7025L
IC304
LA7016
IC305
MB84066B
DL301
2HDL
X301
4.43MHz
FL301
Q301 KN1203
Q302 KN1203
Q303 KN1203
Q304 A1015GR
Q305 A1015GR
Q306 KN1203
Q307 C1815BL
Q308 C1815BL
Q309 C1815BL
Q310 C1815BL
Q311 C1815BL
Q312 KN1203
Q313 A1015GR
Q314 A1015GR
Q315 A1015GR
Q316 C1815BL
Q317 A1015GR
Q318 KN1203
Q321 KN1203
TP301 VIDEO OUT
TP302 CAR/DEV
TP303 PB RF
TP304 S/W 25
①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪
WAVEFORM
PB Y SIGNAL
PB C SIGNAL
REC Y SIGNAL
REC C SIGNAL

The defect in the DL301.
Horizontal line beat appears on the color signal.

The defect in the Q303.
Color signal is bad or Beat occurs.

The defect in the IC304.
TU (Modulator)/SCART Video Switching is failed.

The defect in the Q317.
Screen through SCART out doesn't appear.

The defect in the D303.
Switch to EE mode in the playback mode.

The defect in the Q304, Q305
Playback screen doesn't appear.

The defect in the R360, R363.
Screen through the Modulator doesn't appear.

The defect in the R380, R383, R384, R386.
A thick noise appears on the screen & locking is failed in the changing of speed.

The defect in the X301.
- Color signal doesn't appear.
- Drum speed control is failed.

The defect in the Q307, IC303.
MESECAM Mode : Detecting is failed.
→ Color signal is unstable.

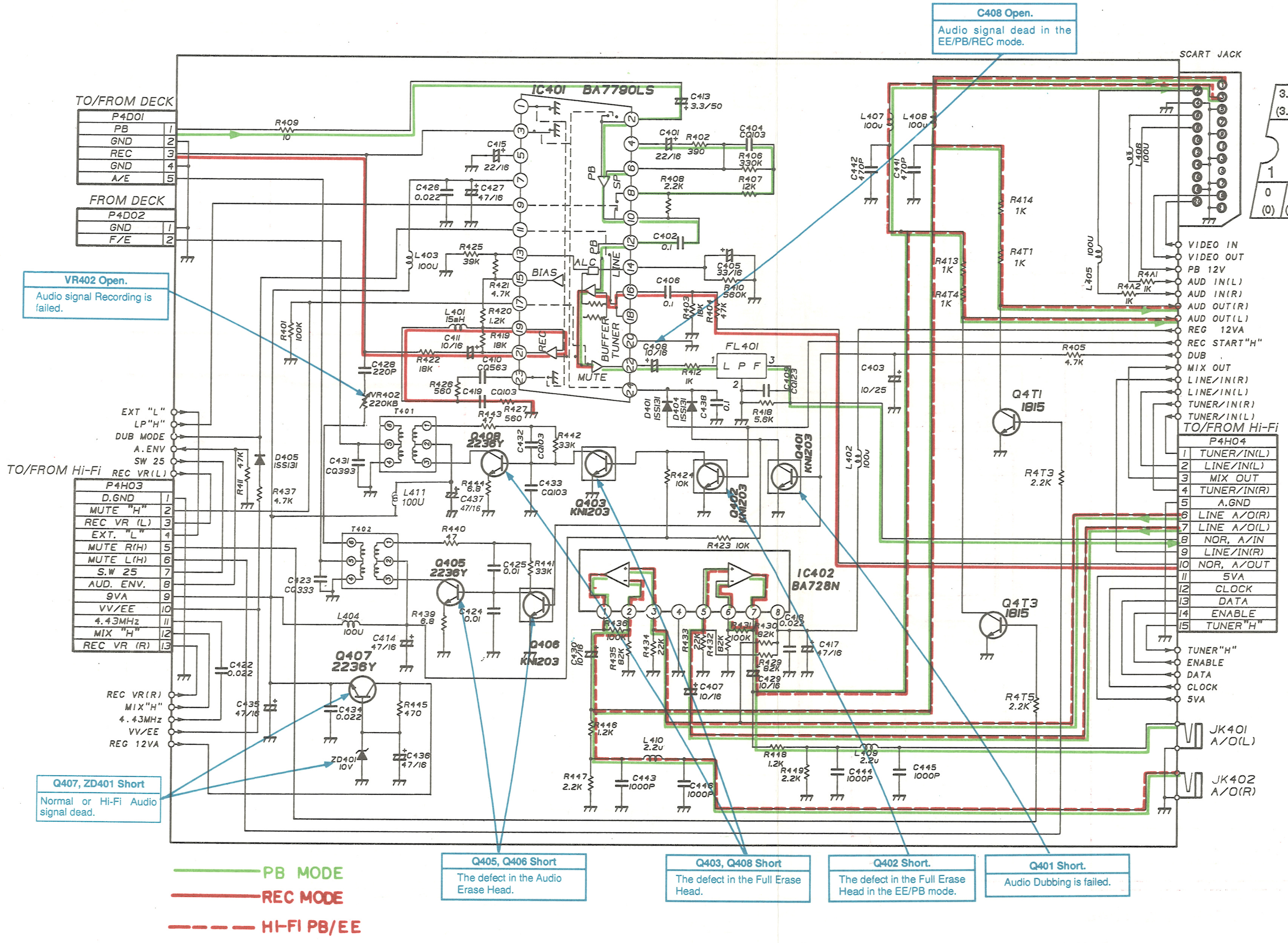
The defect in the Q312, Q313, Q314.
Playback is failed.

The defect in the Q309, Q310, Q311, FL301.
Color signal doesn't appear in the playback mode.

The defect in the Q308, Q315, Q316, IC302.
- Drop-out Compensation is failed.
- Screen is bad in the playback mode.

LOCA No	Position
IC301	3D
IC302	2E
IC303	2F
IC304	4F
IC305	2F
Q301	3B
Q302	4D
Q303	4E
Q304	2C
Q305	2C
Q306	2D
Q307	2E
Q308	2D
Q309	2C
Q310	2C
Q311	2C
Q312	1C
Q313	1C
Q314	1C
Q315	1D
Q316	1E
Q317	3F
Q318	3F
Q321	1B

4. Audio Circuit Diagram (Normal Audio)


IC401 BA7790LS
IC402 BA728N
TO/FROM DECK
P4D01
1 PB
2 GND
3 REC
4 GND
5 A/E
FROM DECK
P4D02
1 GND
2 F/E
TO/FROM Hi-Fi
P4H03
1 D.GND
2 MUTE "H"
3 REC VR (L)
4 EXT. "L"
5 MUTE R(H)
6 MUTE L(H)
7 S.W 25
8 AUD. ENV.
9 9VA
10 VV/EE
11 4.43MHz
12 MIX "H"
13 REC VR (R)
EXT "L"
LP"H"
DUB MODE
A.ENV
SW 25
REC VR(L)
REC VR(R)
MIX"H"
4.43MHz
VV/EE
REG 12VA
SCART JACK
VIDEO IN
VIDEO OUT
PB 12V
AUD IN(L)
AUD IN(R)
AUD OUT(R)
AUD OUT(L)
REG 12VA
REC START"H"
DUB
MIX OUT
LINE/IN(R)
LINE/IN(L)
TUNER/IN(R)
TUNER/IN(L)
TO/FROM Hi-Fi
P4H04
1 TUNER/IN(L)
2 LINE/IN(L)
3 MIX OUT
4 TUNER/IN(R)
5 A.GND
6 LINE A/O(R)
7 LINE A/O(L)
8 NOR. A/IN
9 LINE/IN(R)
10 NOR. A/OUT
11 5VA
12 CLOCK
13 DATA
14 ENABLE
15 TUNER"H"
TUNER"H"
ENABLE
DATA
CLOCK
5VA
JK401 A/O(L)
JK402 A/O(R)
Q401 KN1203
Q402 KN1203
Q403 KN1203
Q405 2236Y
Q406 KN1203
Q407 2236Y
Q408 2236Y
Q4T1 1815
Q4T3 1815
ZD401 10V
D401 1SS131
D404 1SS131
D405 1SS131
FL401 L P F
T401
T402
VR402 220KB
BIAS
ALC
PB
REC
SP
LINE
BUFFER
TUNER
MUTE
R409 10
C413 3.3/50
C415 22/16
C401 22/16
R402 390
C404 CQ103
R406 330K
R407 12K
R408 2.2K
C426 0.022
C427 47/16
C402 0.1
C405 33/16
R410 560K
C406 0.1
R403 18K
R404 47K
L403 100U
R425 39K
R421 4.7K
L401 15mH
R420 1.2K
R419 18K
C411 10/16
C410 CQ563
R422 18K
R426 560
C419 CQ103
C408 10/16
R412 1K
C428 220P
R401 100K
R443 47
R427 560
C442 470P
C441 470P
L407 100U
L408 100U
L406 100U
R414 1K
R4T1 1K
R413 1K
R4T4 1K
R4A1 1K
R4A2 1K
L405 100U
R405 4.7K
C403 10/25
C409 CQ123
C438 0.1
R418 5.6K
L402 100U
R4T3 2.2K
R4T5 2.2K
R411 47K
R437 4.7K
C431 CQ393
L411 100U
R414 6.8
C437 47/16
C432 CQ103
R442 33K
C433 CQ103
R424 10K
R423 10K
R440 47
C423 CQ333
C425 0.01
R441 33K
L404 100U
R439 6.8
C424 0.01
C414 47/16
C430 10/16
R436 100K
R435 82K
R434 22K
R433 22K
R432 82K
R431 100K
R430 82K
R429 82K
C418 0.022
C417 47/16
C429 10/16
C407 10/16
C422 0.022
C435 47/16
C434 0.022
R445 470
C436 47/16
R448 1.2K
L410 2.2U
R447 2.2K
C443 1000P
C446 1000P
R448 1.2K
R449 2.2K
L409 2.2U
C444 1000P
C445 1000P
5
4
3
2
1
A
B
C
D
E
F
G
H

C408 Open.
Audio signal dead in the EE/PB/REC mode.

VR402 Open.
Audio signal Recording is failed.

Q407, ZD401 Short
Normal or Hi-Fi Audio signal dead.

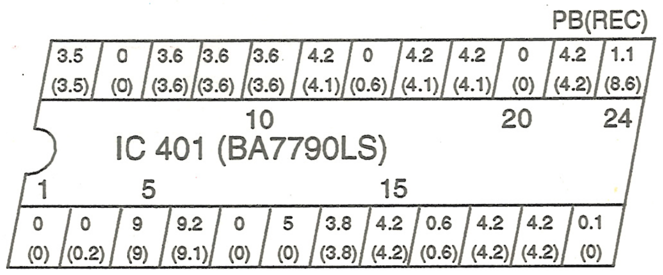
Q405, Q406 Short
The defect in the Audio Erase Head.

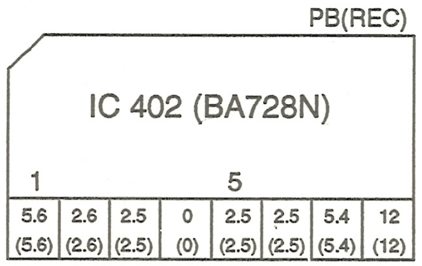
Q403, Q408 Short
The defect in the Full Erase Head.

Q402 Short.
The defect in the Full Erase Head in the EE/PB mode.

Q401 Short.
Audio Dubbing is failed.

PB MODE
REC MODE
HI-FI PB/EE


PB(REC)
3.5 (3.5)
0 (0)
3.6 (3.6)
3.6 (3.6)
3.6 (3.6)
4.2 (4.1)
0 (0.6)
4.2 (4.1)
4.2 (4.1)
0 (0)
4.2 (4.2)
1.1 (8.6)
10
20
24
IC 401 (BA7790LS)
1
5
15
0 (0)
0 (0.2)
9 (9)
9.2 (9.1)
0 (0)
5 (0)
3.8 (3.8)
4.2 (4.2)
0.6 (0.6)
4.2 (4.2)
4.2 (4.2)
0.1 (0)


PB(REC)
IC 402 (BA728N)
1
5
5.6 (5.6)
2.6 (2.6)
2.5 (2.5)
0 (0)
2.5 (2.5)
2.5 (2.5)
5.4 (5.4)
12 (12)

LOCA No	Posi- tion
IC401	5C
IC402	2D
Q401	3D
Q402	3D
Q403	3C
Q405	2C
Q406	2C
Q407	2B
Q408	3C
Q4T1	3E
Q4T3	2E

* Normal Audio TR Voltage Sheet

(PB/REC mode)

Port / TR No.	Emitter	Collector	Base
Q401	0/0	0/8.9	5/0
Q402	0/0	6.3/0	0.35/5.0
Q403	0/0	0/0.7	6.3/0
Q405	0/0.5	9.1/8.8	0/1.0
Q406	0/0	0/1.0	5/0
Q407	9.2/9.2	12/12	9.8/9.8
Q408	0/0.33	9.1/8.9	0/0.7

Audio Circuit Diagram (Hi-Fi Audio)

IC 451 (TA8813AN) PB(REC)

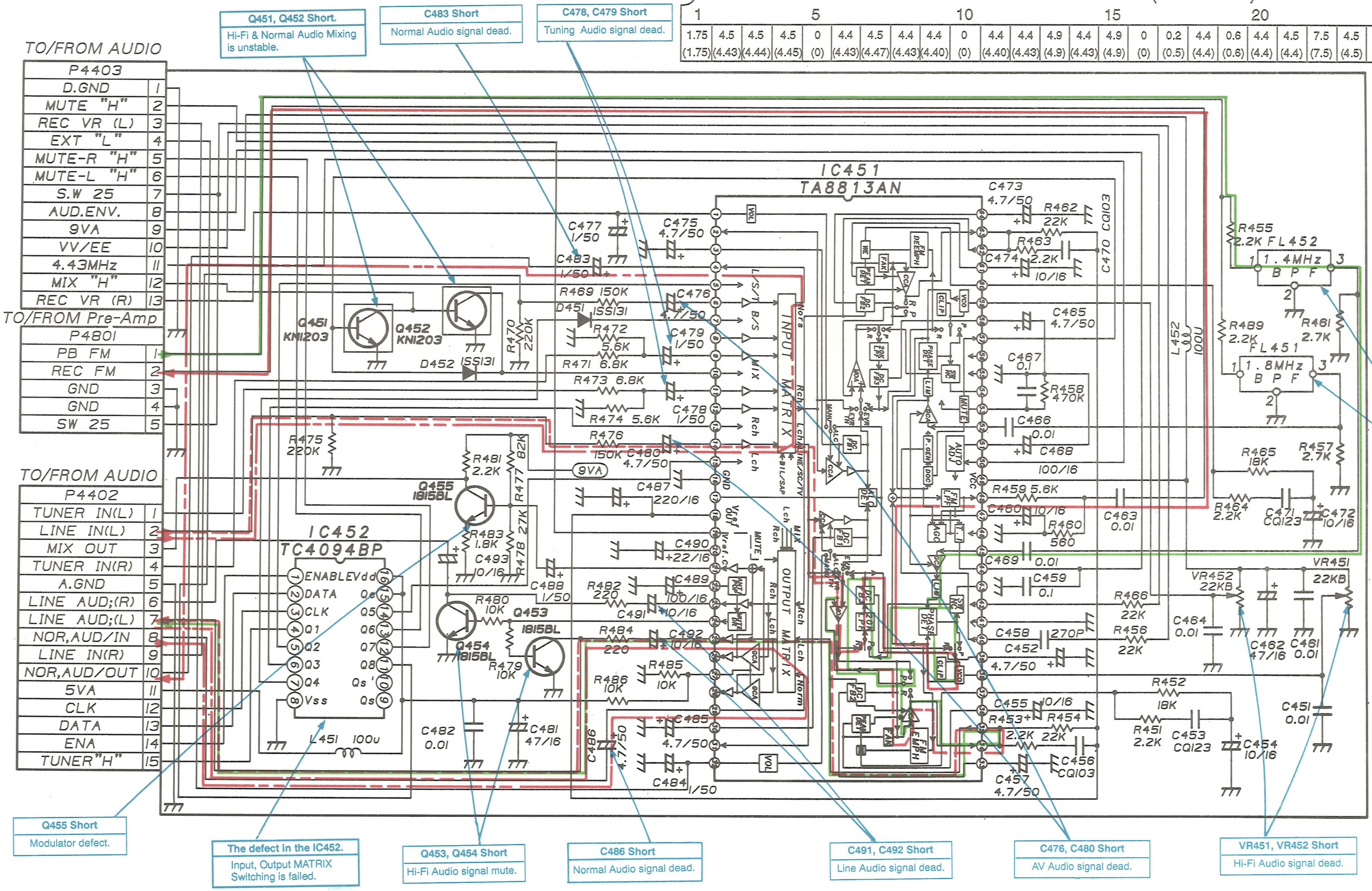
Pin	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
PB	4.4	4.4	4.4	0.3	4.5	5	4.9	0.5	0	0	3.8	1.7	3.7	2.0	3.0	9	5.5	1.2	2.5	3.7	3.0	3.8	4.3	0	3.7	4.8	4.3	4.4	0.4	4.4	4.4	4.4
(REC)	(4.4)	(4.4)	(4.4)	(0.3)	(4.47)	(5)	(4.6)	(0)	(0)	(0)	(3.8)	(1.7)	(3.9)	(2)	(3.1)	(9)	(5.3)	(1.3)	(2.6)	(3.9)	(0)	(3.8)	(0.7)	(0)	(3.9)	(4.6)	(4.3)	(4.4)	(0.4)	(4.4)	(4.4)	(4.4)

Pin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
PB	1.75	4.5	4.5	4.5	0	4.4	4.5	4.4	4.4	0	4.4	4.4	4.9	4.4	4.9	0	0.2	4.4	0.6	4.4	4.5	7.5	4.5	0	4.5	4.4	2.5	4.5	4.4	4.5	4.4	1.78
(REC)	(1.75)	(4.43)	(4.44)	(4.45)	(0)	(4.43)	(4.47)	(4.43)	(4.40)	(0)	(4.40)	(4.43)	(4.9)	(4.43)	(4.9)	(0)	(0.5)	(4.4)	(0.6)	(4.4)	(4.4)	(7.5)	(4.5)	(0)	(4.5)	(4.4)	(2.5)	(4.5)	(4.4)	(4.6)	(4.4)	(1.78)

IC 452 (TC4094BP) PB(REC)

Pin	16	15	14	13	12	11	10	9
PB	4.9	4.9	4.9	0	0	4.9	2.0	2.0
(REC)	(4.9)	(4.9)	(4.9)	(0)	(0)	(4.9)	(2.0)	(2.0)

Pin	1	2	3	4	5	6	7	8
PB	0	0.2	0	4.8	0	4.9	4.9	0
(REC)	(0)	(0.2)	(0)	(4.8)	(0)	(4.9)	(4.9)	(0)


TO/FROM AUDIO
P4403
D.GND 1
MUTE "H" 2
REC VR (L) 3
EXT "L" 4
MUTE-R "H" 5
MUTE-L "H" 6
S.W 25 7
AUD.ENV. 8
9VA 9
VV/EE 10
4.43MHz 11
MIX "H" 12
REC VR (R) 13
TO/FROM Pre-Amp
P4801
PB FM 1
REC FM 2
GND 3
GND 4
SW 25 5
TO/FROM AUDIO
P4402
TUNER IN(L) 1
LINE IN(L) 2
MIX OUT 3
TUNER IN(R) 4
A.GND 5
LINE AUD;(R) 6
LINE AUD;(L) 7
NOR,AUD/IN 8
LINE IN(R) 9
NOR,AUD/OUT 10
5VA 11
CLK 12
DATA 13
ENA 14
TUNER"H" 15
Q451 KN1203
Q452 KN1203
D451 1SS131
D452 1SS131
R470 220K
R475 220K
Q455 1815BL
R481 2.2K
R477 82K
R483 1.8K
R478 27K
C493 10/16
IC452 TC4094BP
ENABLE Vdd DATA CLK Q1 Q2 Q3 Q4 Vss Qs Qs' Q5 Q6 Q7 Q8
L451 100u
Q453 1815BL
Q454 1815BL
R480 10K
R479 10K
C482 0.01
C481 47/16
C488 1/50
IC451 TA8813AN
C477 1/50
C483 1/50
C475 4.7/50
R469 150K
C476 4.7/50
R472 5.6K
C479 1/50
R471 6.8K
R473 6.8K
R474 5.6K
C478 1/50
R476 150K
C480 4.7/50
9VA
C487 220/16
C490 22/16
R482 220
C489 100/16
C491 10/16
R484 220
C492 10/16
R486 10K
R485 10K
C486 4.7/50
C485 4.7/50
C484 1/50
INPUT MATRIX
OUTPUT MATRIX
VOL
C473 4.7/50
R462 22K
R463 2.2K
C474 10/16
C470 CQ103
C465 4.7/50
C467 0.1
R458 470K
C466 0.01
C468 100/16
R459 5.6K
C460 10/16
R460 560
C463 0.01
C469 0.01
C459 0.1
C458 270P
C452 4.7/50
C455 10/16
R453 2.2K
R454 22K
C456 CQ103
C457 4.7/50
L452 100U
R455 2.2K
FL452 1.4MHz BPF
R489 2.2K
FL451 1.8MHz BPF
R461 2.7K
R465 18K
R457 2.7K
R464 2.2K
C471 CQ123
C472 10/16
R466 22K
R456 22K
C464 0.01
VR452 22KB
VR451 22KB
C462 47/16
C461 0.01
R452 18K
R451 2.2K
C453 CQ123
C454 10/16
C451 0.01

LOCA No	Position
IC451	3D
IC452	2B
Q451	3B
Q452	3C
Q453	2C
Q454	2C
Q455	2C

Q451, Q452 Short.
Hi-Fi & Normal Audio Mixing is unstable.

C483 Short
Normal Audio signal dead.

C478, C479 Short
Tuning Audio signal dead.

FL451, FL452 Short
Hi-Fi Audio signal dead.

Q455 Short
Modulator defect.

The defect in the IC452.
Input, Output MATRIX Switching is failed.

Q453, Q454 Short
Hi-Fi Audio signal mute.

C486 Short
Normal Audio signal dead.

C491, C492 Short
Line Audio signal dead.

C476, C480 Short
AV Audio signal dead.

VR451, VR452 Short
Hi-Fi Audio signal dead.

* Hi-Fi Audio TR Voltage Sheet

(PB/REC mode)

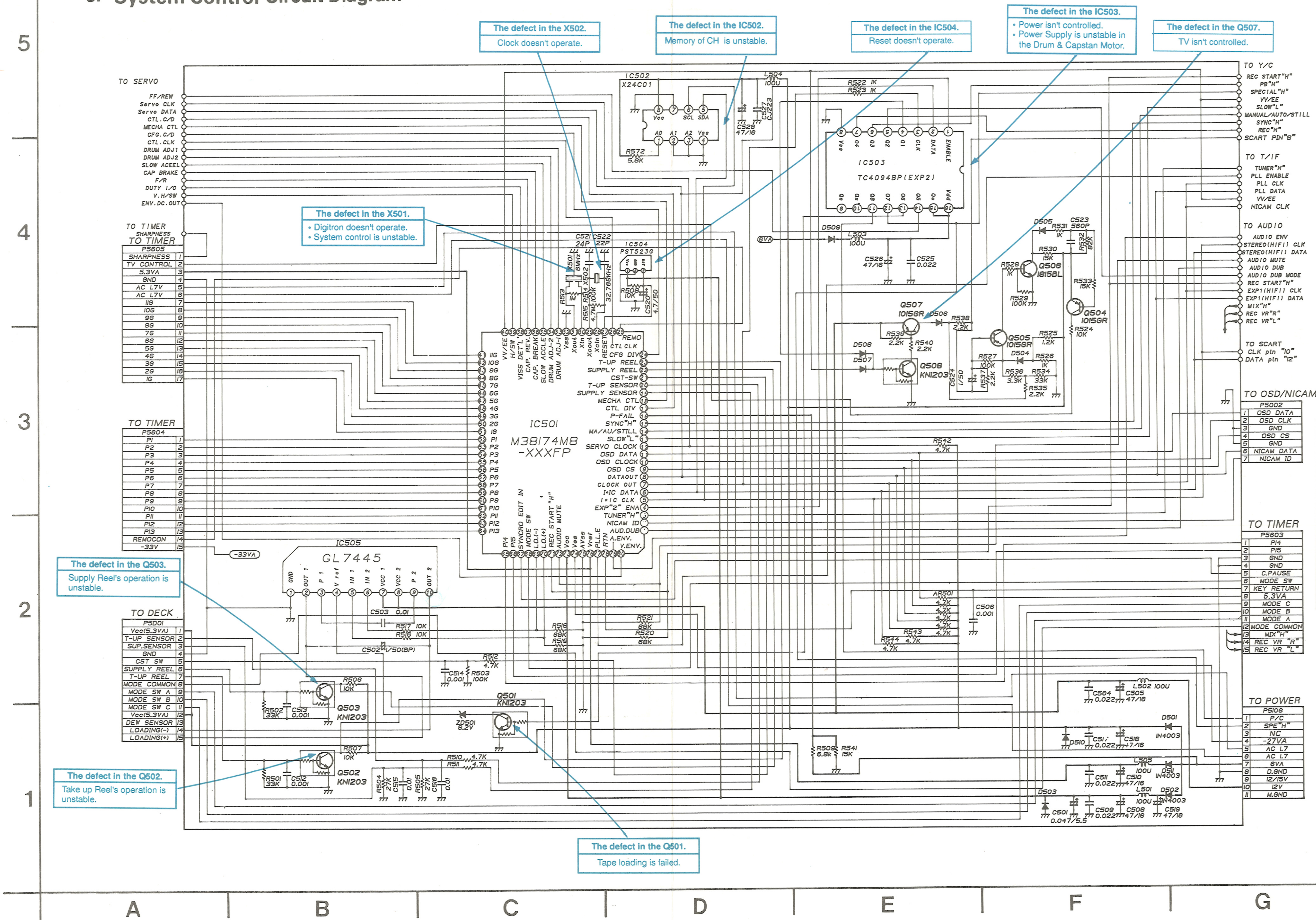
Port TR No.	Emitter	Collector	Base
Q451	0/0	5.2/5.2	0.5/0
Q452	0/0	0/0	5.2/5.2
Q453	0/0	0.1/0.1	0.1/0.1
Q454	0/0	0.1/0.1	0.1/0.1
Q455	1.6/1.6	6.7/6.7	2.2/2.2

——	REC MODE (HI-FI "L")
— — —	EE MODE (HI-FI "L")
—-·—-·	EE MODE (NORMAL)
——	PB MODE (HI FI "L")

5 4 3 2 1

A B C D E F G H

5. System Control Circuit Diagram


5
4
3
2
1
A
B
C
D
E
F
G
H
TO SERVO
FF/REW
Servo CLK
Servo DATA
CTL.C/D
MECHA CTL
CFG.C/D
CTL.CLK
DRUM ADJ1
DRUM ADJ2
SLOW ACEEL
CAP BRAKE
F/R
DUTY I/O
V.H/SW
ENV.DC.OUT
TO TIMER
SHARPNESS
TO TIMER
P5605
SHARPNESS
TV CONTROL
5.3VA
GND
AC L7V
AC L7V
TO TIMER
P5604
REMOCON
-33V
-33VA
TO DECK
P5D01
Vcc(5.3VA)
T-UP SENSOR
SUP.SENSOR
GND
CST SW
SUPPLY REEL
T-UP REEL
MODE COMMON
MODE SW A
MODE SW B
MODE SW C
Vcc(5.3VA)
DEW SENSOR
LOADING(-)
LOADING(+)
IC502
X24C01
L504
100U
C526
47/16
R572
5.6K
IC503
TC4094BP(EXP2)
IC504
PST523G
X501
6MHz
X502
32.768KHz
C521 24P
C522 22P
IC501
M38174M8
-XXXFP
IC505
GL7445
C503 0.01
R517 10K
R516 10K
C502 1/50(BP)
R512 4.7K
C514 0.001
R503 100K
Q503
KN1203
R506 10K
R502 33K
C513 0.001
Q501
KN1203
ZD501 8.2V
Q502
KN1203
R507 10K
R501 33K
C512 0.001
R510 4.7K
R511 4.7K
R518 68K
R521 68K
R520 68K
Q507
1015GR
Q506
1815BL
Q504
1015GR
Q505
1015GR
Q508
KN1203
D505
D508
D507
D509
D504
6VA
L503 100U
C528 47/16
C525 0.022
AR501
C506 0.001
R544 4.7K
R543 4.7K
R542 4.7K
R509 6.8K
R541 15K
TO Y/C
REC START"H"
PB"H"
SPECIAL"H"
VV/EE
SLOW"L"
MANUAL/AUTO/STILL
SYNC"H"
REC"H"
SCART PIN"8"
TO T/IF
TUNER"H"
PLL ENABLE
PLL CLK
PLL DATA
VV/EE
NICAM CLK
TO AUDIO
AUDIO ENV
STEREO(HIFI) CLK
STEREO(HIFI) DATA
AUDIO MUTE
AUDIO DUB
AUDIO DUB MODE
REC START"H"
EXP1(HIFI) CLK
EXP1(HIFI) DATA
MIX"H"
REC VR"R"
REC VR"L"
TO SCART
CLK pin "10"
DATA pin "12"
TO OSD/NICAM
P5002
OSD DATA
OSD CLK
GND
OSD CS
GND
NICAM DATA
NICAM ID
TO TIMER
P5603
P14
P15
GND
GND
C.PAUSE
MODE SW
KEY RETURN
5.3VA
MODE C
MODE B
MODE A
MODE COMMON
MIX"H"
REC VR "R"
REC VR "L"
TO POWER
P5106
P/C
SPE"H"
NC
-27VA
AC L7
AC L7
6VA
D.GND
12/15V
12V
M.GND
L502 100U
C504 0.022
C505 47/16
D501 1N4003
D510
C517 0.022
C518 47/16
L505 100U
C511 0.022
C510 47/16
D511 1N4003
L501 100U
D502 1N4003
D503
C501 0.047/5.5
C509 0.022
C508 47/16
C519 47/16

The defect in the X502.
Clock doesn't operate.

The defect in the IC502.
Memory of CH is unstable.

The defect in the IC504.
Reset doesn't operate.

The defect in the IC503.
- Power isn't controlled.
- Power Supply is unstable in the Drum & Capstan Motor.

The defect in the Q507.
TV isn't controlled.

The defect in the X501.
- Digitron doesn't operate.
- System control is unstable.

The defect in the Q503.
Supply Reel's operation is unstable.

The defect in the Q502.
Take up Reel's operation is unstable.

The defect in the Q501.
Tape loading is failed.

LOCA No	Posi-tion
IC501	3C
IC502	5D
IC503	4E
IC504	4D
IC505	2B
Q501	1C
Q502	1B
Q503	2B
Q504	4F
Q505	4F
Q506	4F
Q507	4E
Q508	3E

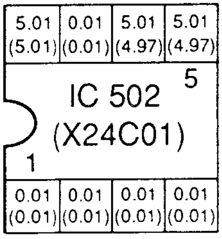
* System Control TR Voltage Sheet

(PB/REC mode)

TR No. \ Port	Emitter	Collector	Base
Q501	0.01/0.01	0.01/0.01	5.10/5.10
Q502	0.01/0.01	Pulse	Pulse
Q503	0.01/0.01	Pulse	Pulse
Q504	5.18/5.17	0.02/0.02	5.11/5.12
Q505	10.97/1.87	0/0	11.44/1.68
Q506	0.01/0	5.17/5.16	0/0.01
Q507	12.01/11.97	12.01/0.10	11.26/11.97
Q508	0/0	0.08/11.97	4.47/0

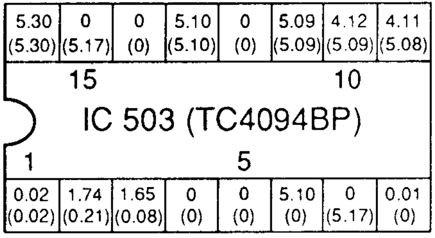
* System Control IC Voltage Sheet

PB(REC)



5.01 (5.01)	0.01 (0.01)	5.01 (4.97)	5.01 (4.97)
0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)

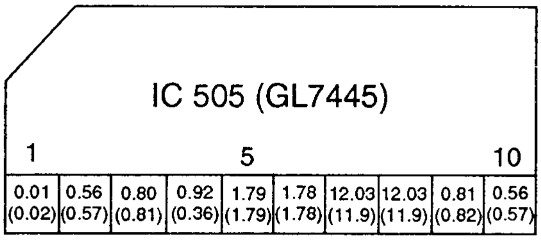
PB(REC)



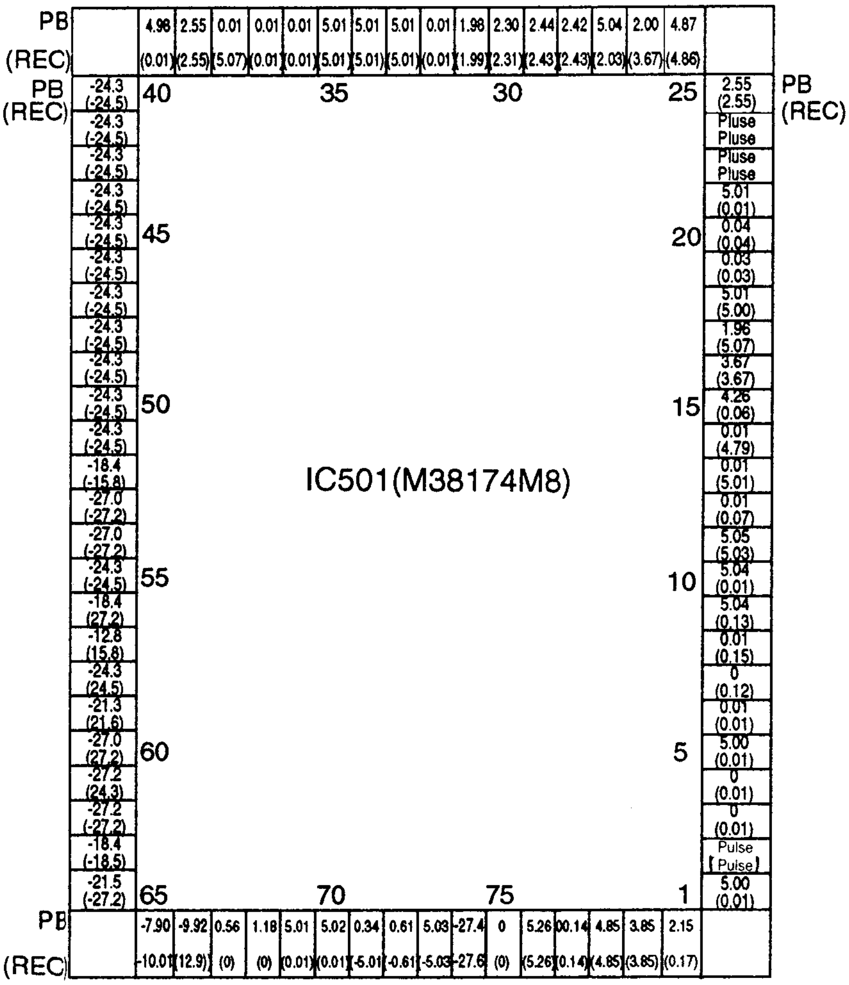
	15					10	
5.30 (5.30)	0 (5.17)	0 (0)	5.10 (5.10)	0 (0)	5.09 (5.09)	4.12 (5.09)	4.11 (5.08)

1				5			
0.02 (0.02)	1.74 (0.21)	1.65 (0.08)	0 (0)	0 (0)	5.10 (0)	0 (5.17)	0.01 (0)

PB(REC)



1				5					10
0.01 (0.02)	0.56 (0.57)	0.80 (0.81)	0.92 (0.36)	1.79 (1.79)	1.78 (1.78)	12.03 (11.9)	12.03 (11.9)	0.81 (0.82)	0.56 (0.57)



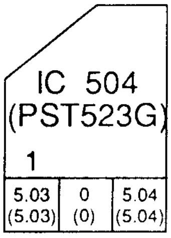
	40					35					30					25
PB	4.98	2.55	0.01	0.01	0.01	5.01	5.01	5.01	0.01	1.98	2.30	2.44	2.42	5.04	2.00	4.87
(REC)	(0.01)	(2.55)	(5.07)	(0.01)	(0.01)	(5.01)	(5.01)	(5.01)	(0.01)	(1.99)	(2.31)	(2.43)	(2.43)	(2.03)	(3.67)	(4.86)

	PB	(REC)
40	-24.3	(-24.5)
	-24.3	(-24.5)
	-24.3	(-24.5)
	-24.3	(-24.5)
45	-24.3	(-24.5)
	-24.3	(-24.5)
	-24.3	(-24.5)
	-24.3	(-24.5)
	-24.3	(-24.5)
50	-24.3	(-24.5)
	-24.3	(-24.5)
	-18.4	(-15.8)
	-27.0	(-27.2)
	-27.0	(-27.2)
55	-24.3	(-24.5)
	-18.4	(27.2)
	-12.8	(15.8)
	-24.3	(24.5)
	-21.3	(21.6)
60	-27.0	(27.2)
	-27.2	(24.3)
	-27.2	(-27.2)
	-18.4	(-18.5)
65	-21.5	(-27.2)

	PB	(REC)
25	2.55	(2.55)
	Pluse	Pluse
	Pluse	Pluse
	5.01	(0.01)
20	0.04	(0.04)
	0.03	(0.03)
	5.01	(5.00)
	1.96	(5.07)
	3.67	(3.67)
15	4.26	(0.06)
	0.01	(4.79)
	0.01	(5.01)
	0.01	(0.07)
	5.05	(5.03)
10	5.04	(0.01)
	5.04	(0.13)
	0.01	(0.15)
	0	(0.12)
	0.01	(0.01)
5	5.00	(0.01)
	0	(0.01)
	0	(0.01)
	Pulse	(Pulse)
1	5.00	(0.01)

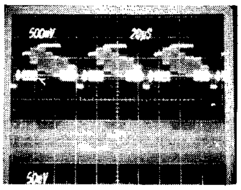
	65					70					75					1
PB	-7.90	-9.92	0.56	1.18	5.01	5.02	0.34	0.61	5.03	-27.4	0	5.26	00.14	4.85	3.85	2.15
(REC)	(-10.01)	(12.9)	(0)	(0)	(0.01)	(0.01)	(-5.01)	(-0.61)	(-5.03)	(-27.6)	(0)	(5.26)	(0.14)	(4.85)	(3.85)	(0.17)

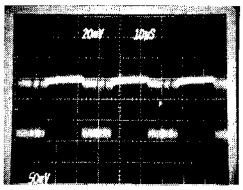
PB(REC)

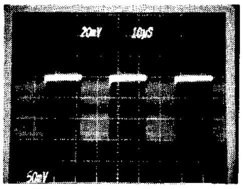


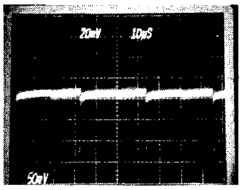
1		
5.03 (5.03)	0 (0)	5.04 (5.04)

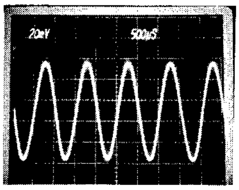
* NICAM Waveform

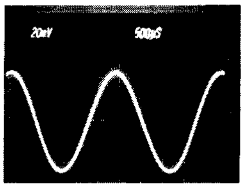
①

P0703 Pin ①
SIF Input
(50mV/20μsec)

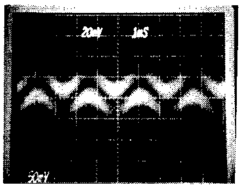
②

IC703 Pin ⑬
S-DATA
(50mV/10μsec)

③

IC703 Pin ⑫
S-CLOCK
(50mV/10μsec)

④

IC703 Pin ⑪
S-ID
(20mV/10μsec)

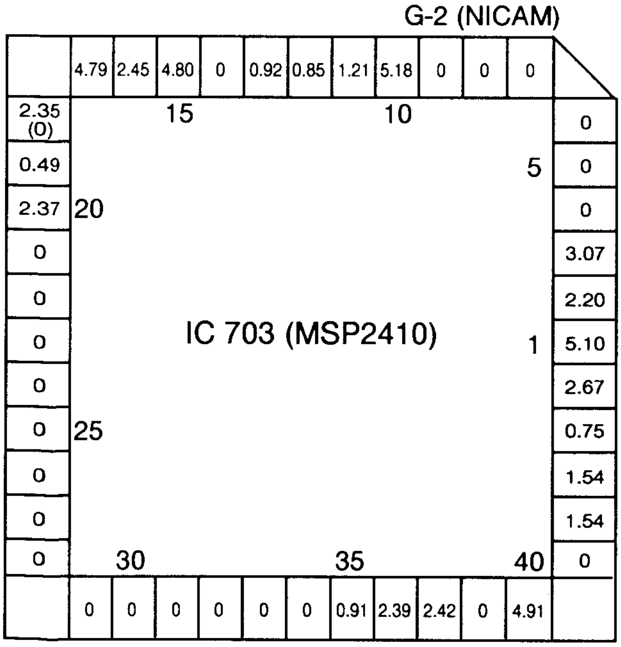
⑤

P0703 Pin ⑧
Audio Left Out Terminal
(20mV/500μsec)

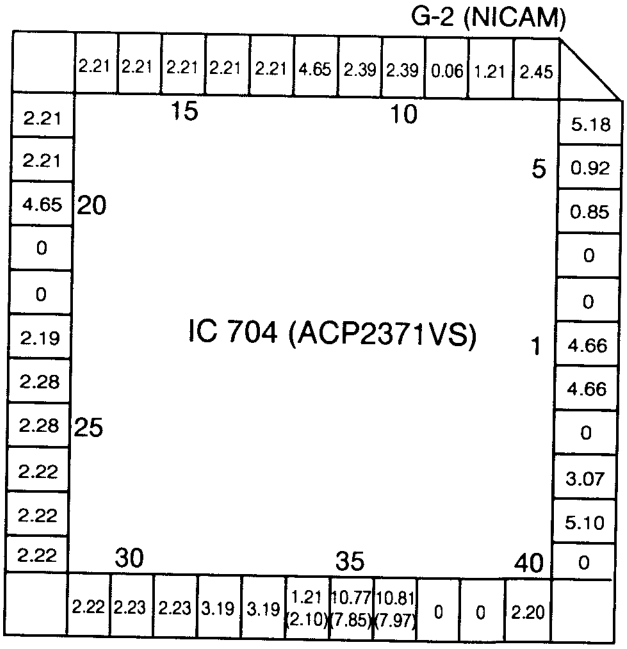
⑥

P0703 Pin ⑩
Audio Right Out Terminal
(20mV/500μsec)

⑦

IC704 Pin ⑲
PILOT
(20mV/1msec)

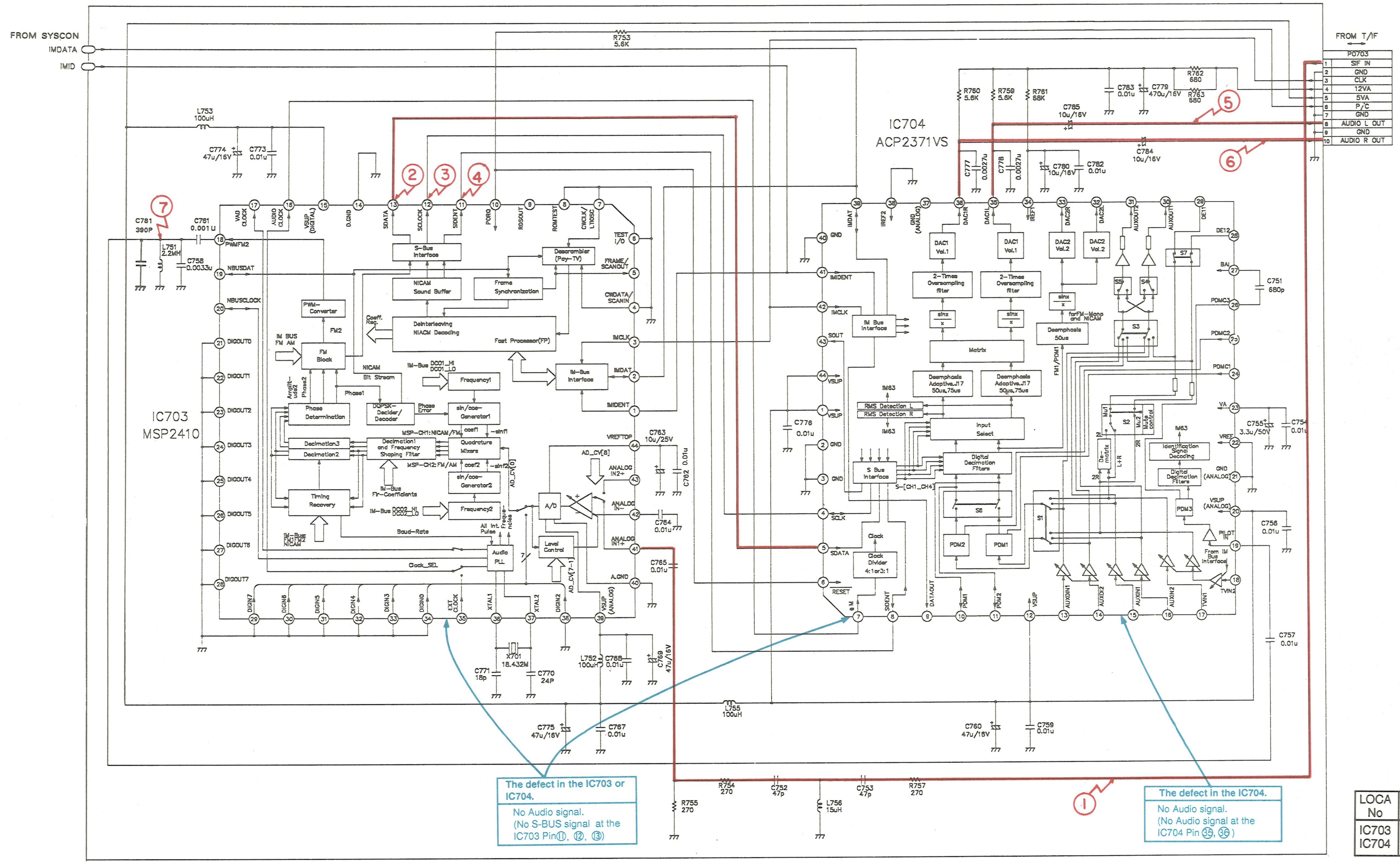
* NICAM IC Voltage Sheet

<The Voltage in NICAM mode not written, the same that in G-2 (German-2 carrier) mode>.


G-2 (NICAM)
IC 703 (MSP2410)
4.79
2.45
4.80
0
0.92
0.85
1.21
5.18
0
0
0
15
10
5
1
20
25
30
35
40
2.35 (0)
0.49
2.37
0
0
0
0
0
0
0
0
0
0
0
3.07
2.20
5.10
2.67
0.75
1.54
1.54
0
0
0
0
0
0
0
0.91
2.39
2.42
0
4.91


G-2 (NICAM)
IC 704 (ACP2371VS)
2.21
2.21
2.21
2.21
2.21
4.65
2.39
2.39
0.06
1.21
2.45
15
10
5
1
20
25
30
35
40
2.21
2.21
4.65
0
0
2.19
2.28
2.28
2.22
2.22
2.22
5.18
0.92
0.85
0
0
4.66
4.66
0
3.07
5.10
0
2.22
2.23
2.23
3.19
3.19
1.21 (2.10)
10.77 (7.85)
10.81 (7.97)
0
0
2.20

6. NICAM Circuit Diagram


FROM SYSCON
IMDATA
IMID
FROM T/IF
P0703
1 SIF IN
2 GND
3 CLK
4 12VA
5 5VA
6 P/C
7 GND
8 AUDIO L OUT
9 GND
10 AUDIO R OUT
IC703
MSP2410
IC704
ACP2371VS
R753 5.6K
L753 100uH
C774 47u/16V
C773 0.01u
C781 390P
C761 0.001u
L751 2.2MH
C758 0.0033u
R760 5.6K
R759 5.6K
R761 68K
C783 0.01u
C779 470u/16V
R762 680
R763 680
C765 10u/16V
C784 10u/16V
C777 0.0027u
C778 0.0027u
C780 10u/16V
C782 0.01u
C751 680p
C755 3.3u/50V
C754 0.01u
C756 0.01u
C757 0.01u
C776 0.01u
C763 10u/25V
C762 0.01u
C764 0.01u
C765 0.01u
X701 18.432M
C771 18p
C770 24P
L752 100uH
C768 0.01u
C769 47u/16V
L755 100uH
C775 47u/16V
C767 0.01u
C760 47u/16V
C759 0.01u
R754 270
C752 47p
C753 47p
R757 270
R755 270
L756 15uH
S-Bus Interface
Descrambler (Pay-TV)
NICAM Sound Buffer
Frame Synchronization
Deinterleaving NICAM Decoding
Fast Processor(FP)
PWM-Converter
FM Block
IM-Bus Interface
Phase Determination
DQPSK-Decider/Decoder
Decimation3
Decimation2
Decimation1 and Frequency Shaping Filter
Quadrature Mixers
sin/cos-Generator1
sin/cos-Generator2
Frequency1
Frequency2
Timing Recovery
Audio PLL
Level Control
A/D
DAC1 Vol.1
DAC2 Vol.2
2-Times Oversampling filter
Matrix
Deemphasis 50us
Deemphasis Adaptive J17 50us,75us
RMS Detection L
RMS Detection R
Input Select
IM Bus Interface
S Bus Interface
Digital Decimation Filters
Identification Signal Decoding
Clock Divider 4:1or3:1
SDATA
SCLOCK
SIDENT
SCLK
RESET
AUXIN1
AUXIN2
AUDIO SIGNAL LOOP
WAVEFORM
①
②
③
④
⑤
⑥
⑦

The defect in the IC703 or IC704.

No Audio signal.
(No S-BUS signal at the IC703 Pin⑪, ⑫, ⑬)

The defect in the IC704.

No Audio signal.
(No Audio signal at the IC704 Pin㉟, ㊱)

LOCA No	Posi-tion
IC703	3B
IC704	3E

AUDIO SIGNAL LOOP

WAVEFORM

7. Tuner/IF Circuit Diagram

The defect in the MD701 Pin ③.
Video signal doesn't appear on the TV screen.

The defect in the TU701 Pin ⑧.
Tuning is failed. (No 12V Power)

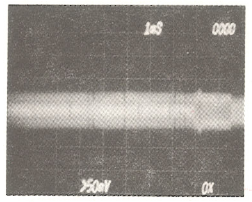
The defect in the TU701 Pin⑦.
Video signal doesn't appear. (No IF signal)

The defect in the IC701.
Tuning video signal doesn't appear. (No Video signal at the IC701 Pin ⑭)

Note: The components identified by mark ⚠ are critical for safety.
Replace only with part number specified.

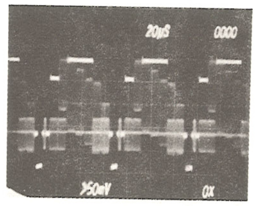
* Tuner/IF Waveform

①



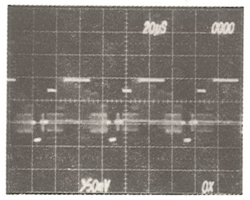
Q701 Base
(50mV/1msec)

②



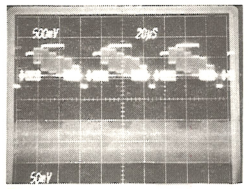
IC701 Pin ⑭
(50mV/20μsec)

③



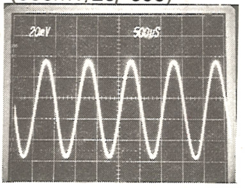
Q703 Emitter
(50mV/20μsec)

④



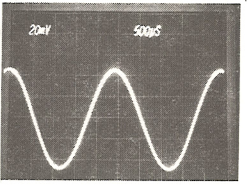
IC702 Pin ⑫
(500mV/20μsec)

⑤

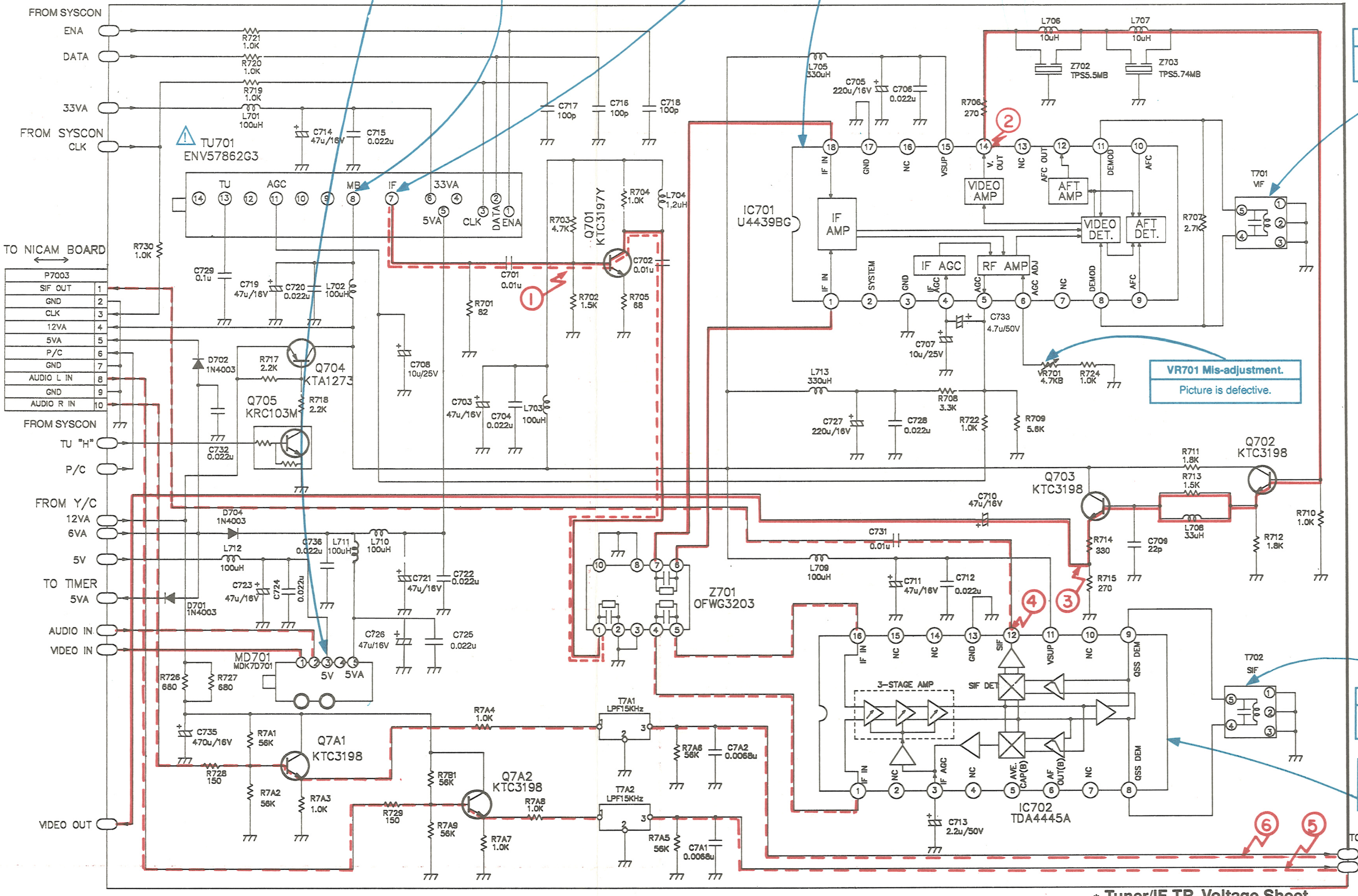


Audio Left Out Terminal
T7A2 Pin ③
(20mV/500μsec)

⑥



Audio Right Out Terminal
T7A1 Pin ③
(20mV/500μsec)


FROM SYSCON
ENA
DATA
33VA
FROM SYSCON
CLK
R721 1.0K
R720 1.0K
R719 1.0K
L701 100uH
C714 47u/16V
C715 0.022u
C717 100p
C716 100p
C718 100p
TU701
ENV57862G3
TU
AGC
MB
IF
33VA
5VA
CLK
DATA
ENA
TO NICAM BOARD
P7003
SIF OUT
GND
CLK
12VA
5VA
P/C
GND
AUDIO L IN
GND
AUDIO R IN
R730 1.0K
C729 0.1u
C719 47u/16V
C720 0.022u
L702 100uH
R703 4.7K
Q701 KTC3197Y
R704 1.0K
L704 1.2uH
C702 0.01u
C701 0.01u
R701 82
R702 1.5K
R705 68
D702 1N4003
R717 2.2K
Q704 KTA1273
Q705 KRC103M
R718 2.2K
C708 10u/25V
C703 47u/16V
C704 0.022u
L703 100uH
C732 0.022u
FROM SYSCON
TU "H"
P/C
FROM Y/C
12VA
6VA
5V
TO TIMER
5VA
D704 1N4003
L712 100uH
C736 0.022u
L711 100uH
L710 100uH
C723 47u/16V
C724 0.022u
D701 1N4003
C721 47u/16V
C722 0.022u
AUDIO IN
VIDEO IN
MD701
MDK7D701
5V
5VA
C726 47u/16V
C725 0.022u
R726 680
R727 680
C735 470u/16V
R7A1 56K
Q7A1
KTC3198
R728 150
R7A2 56K
R7A3 1.0K
R7A4 1.0K
T7A1 LPF15KHz
R7B1 56K
Q7A2
KTC3198
R729 150
R7A9 56K
R7A8 1.0K
R7A7 1.0K
T7A2 LPF15KHz
R7A6 56K
C7A2 0.0068u
R7A5 56K
C7A1 0.0068u
VIDEO OUT
Z701
OFWG3203
L705 330uH
C705 220u/16V
C706 0.022u
L706 10uH
L707 10uH
Z702 TPS5.5MB
Z703 TPS5.74MB
R706 270
IC701
U4439BG
IF IN
GND
NC
VSUP
V. OUT
NC
AFC OUT
DEMOD
AFC
VIDEO AMP
AFT AMP
IF AMP
VIDEO DET.
AFT DET.
IF AGC
RF AMP
SYSTEM
IF AGC
AGC
AGC ADJ
DEMOD
R707 2.7K
T701
VIF
C733 4.7u/50V
C707 10u/25V
VR701 4.7KB
R724 1.0K
L713 330uH
C727 220u/16V
C728 0.022u
R708 3.3K
R722 1.0K
R709 5.6K
R711 1.8K
R713 1.5K
Q702 KTC3198
Q703 KTC3198
C710 47u/16V
L708 33uH
R710 1.0K
C731 0.01u
R714 330
C709 22p
R712 1.8K
R715 270
L709 100uH
C711 47u/16V
C712 0.022u
IC702
TDA4445A
3-STAGE AMP
SIF DET
QSS DEM
IF AGC
AVE CAP(B)
AF OUT(B)
SIF
T702
SIF
C713 2.2u/50V
TO HI-FI BOARD
R-CH OUT
L-CH OUT
①
②
③
④
⑤
⑥

T701 Mis-adjustment.
Tuning is failed & "Shoot" appears on the Video signal.

VR701 Mis-adjustment.
Picture is defective.

T702 Mis-adjustment.
No Audio signal. (No Audio signal at the P7003 Pin⑧, ⑩)

The defect in the IC702.
No Audio signal. (No SIF signal at the IC702 Pin ⑫)

LOCA No	Position
IC701	4E
IC702	2E
Q701	4D
Q702	3F
Q703	3F
Q704	3B
Q705	3B
Q7A1	2B
Q7A2	1C

VIDEO SIGNAL LOOP
AUDIO SIGNAL LOOP
WAVEFORM

IC701(U4439BG)

4.51	0	0	11.8	3.25	0	0.73	8.46	5.0
	15							10
1				5				
4.51	0	0	3.23	5.5	1.76	0	8.46	5.0

IC702(TDA4445A)

4.37	0	0	0	5.27	12.1	0	4.77
	15					10	
1				5			
4.37	0.11	2.82	0.11	0.10	0.10	0.10	4.77

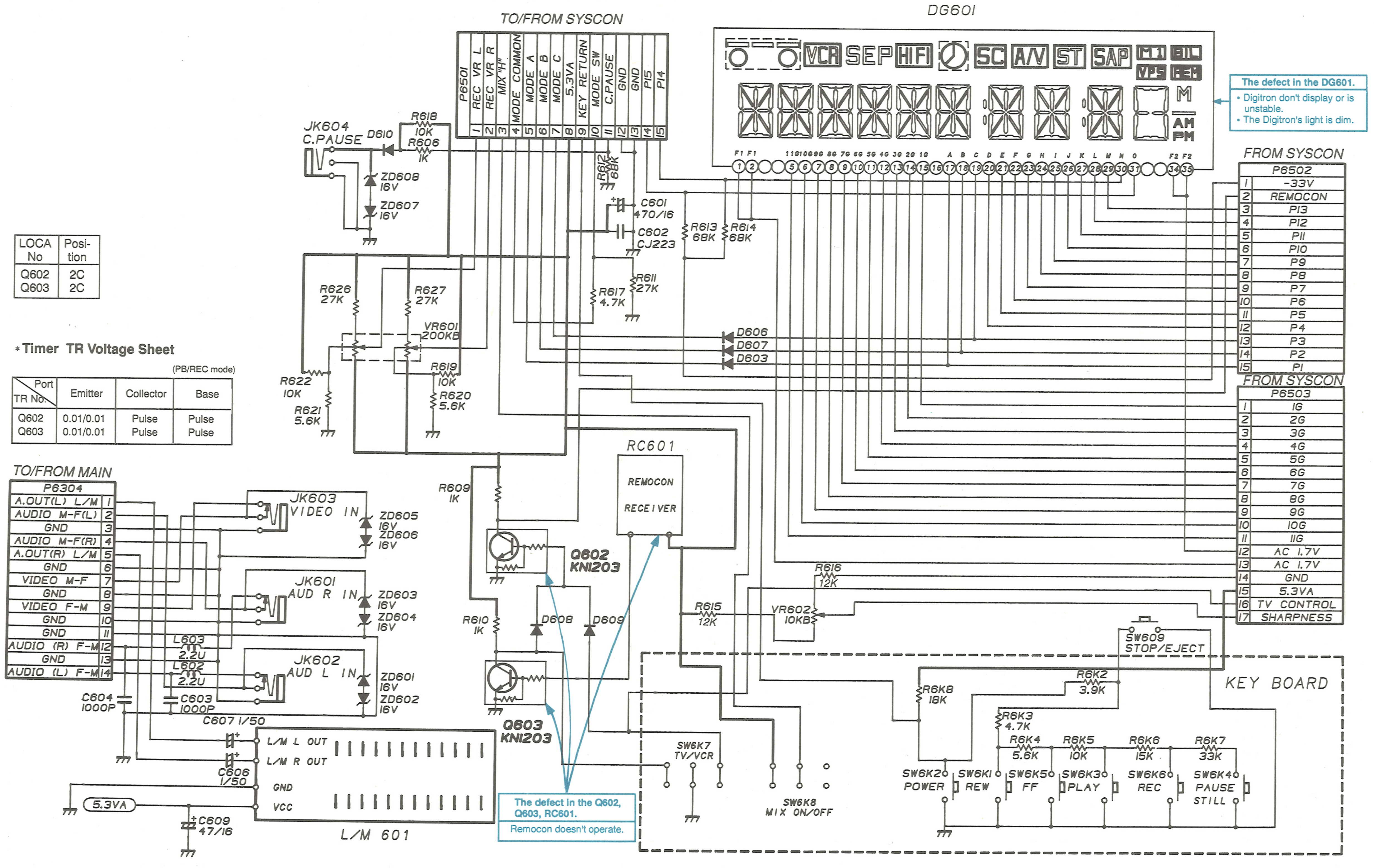
* Tuner/IF TR Voltage Sheet

Port / TR No.	Emitter	Collector	Base
Q701	1.97	12.08	2.67
Q702	1.93	10.22	2.54
Q703	1.30	12.17	1.93
Q704	12.28	12.19	11.55
Q705	0	0.07	4.98
Q7A1	3.80	9.42	4.43
Q7A2	3.80	9.42	4.43

5 4 3 2 1

A B C D E F G H

8. Timer Circuit Diagram


TO/FROM SYSCON
P6501
1 REC VR L
2 REC VR R
3 MIX "H"
4 MODE COMMON
5 MODE A
6 MODE B
7 MODE C
8 5.3VA
9 KEY RETURN
10 MODE SW
11 C.PAUSE
12 GND
13 GND
14 P15
15 P14
DG601
VCR SEP HIFI SC A/V ST SAP M1 BIL VPS F-M
M AM PM
F1 F1 11 10 10 9 9 8 8 7 7 6 6 5 5 4 4 3 3 2 2 1 1 A B C D E F G H I J K L M N O F2 F2
JK604 C.PAUSE
D610
R618 10K
R606 1K
ZD608 16V
ZD607 16V
R612 68K
C601 470/16
C602 CJ223
R613 68K
R614 68K
R626 27K
R627 27K
VR601 200KB
R617 4.7K
R611 27K
R619 10K
R620 5.6K
R622 10K
R621 5.6K
D606
D607
D603
FROM SYSCON
P6502
1 -33V
2 REMOCON
3 P13
4 P12
5 P11
6 P10
7 P9
8 P8
9 P7
10 P6
11 P5
12 P4
13 P3
14 P2
15 P1
FROM SYSCON
P6503
1 1G
2 2G
3 3G
4 4G
5 5G
6 6G
7 7G
8 8G
9 9G
10 10G
11 11G
12 AC 1.7V
13 AC 1.7V
14 GND
15 5.3VA
16 TV CONTROL
17 SHARPNESS
TO/FROM MAIN
P6304
1 A.OUT(L) L/M
2 AUDIO M-F(L)
3 GND
4 AUDIO M-F(R)
5 A.OUT(R) L/M
6 GND
7 VIDEO M-F
8 GND
9 VIDEO F-M
10 GND
11 GND
12 AUDIO (R) F-M
13 GND
14 AUDIO (L) F-M
JK603 VIDEO IN
ZD605 16V
ZD606 16V
JK601 AUD R IN
ZD603 16V
ZD604 16V
JK602 AUD L IN
ZD601 16V
ZD602 16V
L603 2.2U
L602 2.2U
C604 1000P
C603 1000P
C607 1/50
C606 1/50
5.3VA
C609 47/16
L/M L OUT
L/M R OUT
GND
VCC
L/M 601
R609 1K
Q602 KN1203
R610 1K
Q603 KN1203
D608
D609
RC601
REMOCON RECEIVER
R616 12K
R615 12K
VR602 10KB
SW609 STOP/EJECT
KEY BOARD
R6K8 18K
R6K2 3.9K
R6K3 4.7K
R6K4 5.6K
R6K5 10K
R6K6 15K
R6K7 33K
SW6K7 TV/VCR
SW6K8 MIX ON/OFF
SW6K2 POWER
SW6K1 REW
SW6K5 FF
SW6K3 PLAY
SW6K6 REC
SW6K4 PAUSE STILL
5
4
3
2
1
A
B
C
D
E
F
G

LOCA No	Posi-tion
Q602 Q603	2C 2C

*Timer TR Voltage Sheet

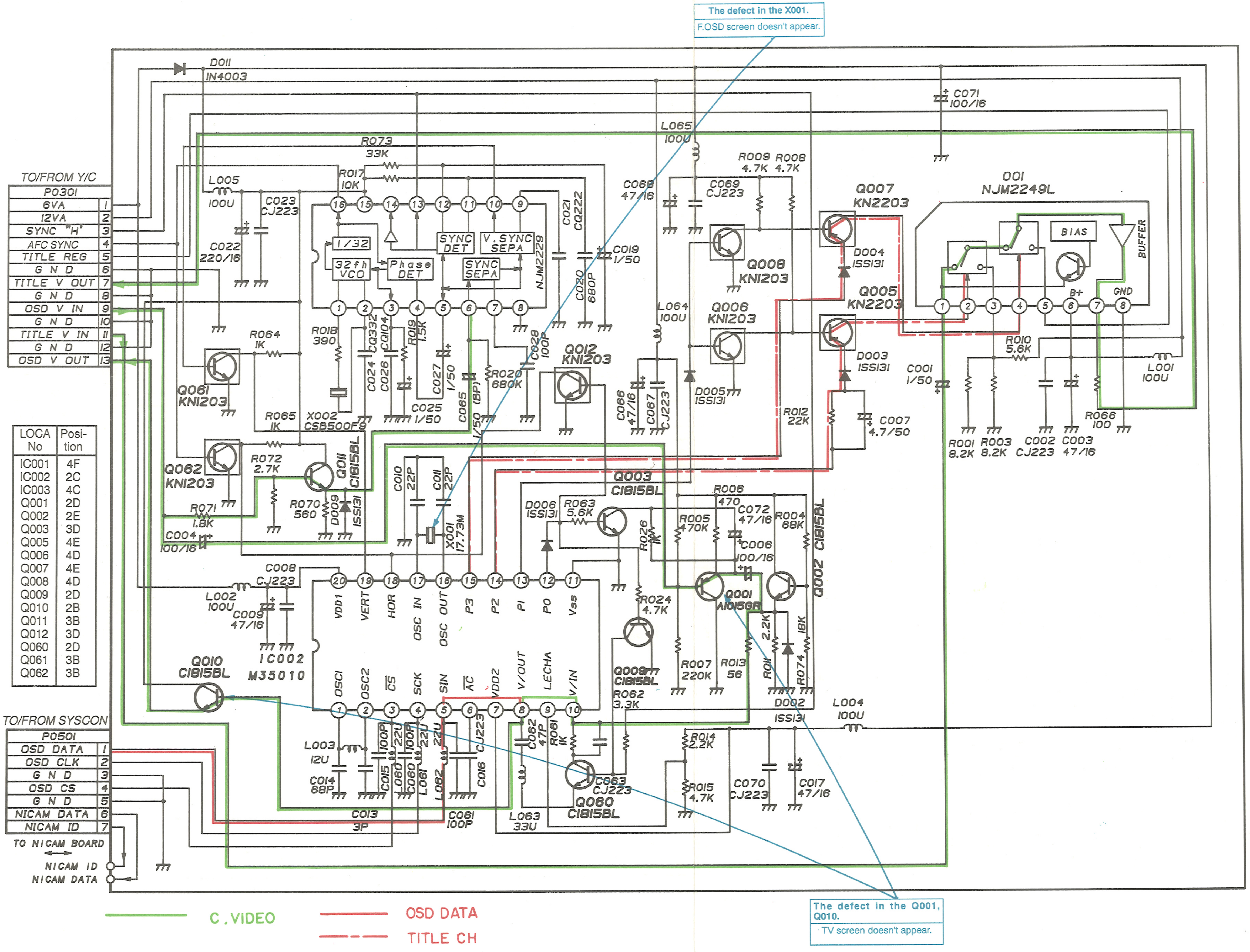
(PB/REC mode)

Port / TR No.	Emitter	Collector	Base
Q602 Q603	0.01/0.01 0.01/0.01	Pulse Pulse	Pulse Pulse

The defect in the DG601.
- Digitron don't display or is unstable.
- The Digitron's light is dim.

The defect in the Q602, Q603, RC601.
Remocon doesn't operate.

9. Function OSD / Title Circuit Diagram


D011 1N4003
TO/FROM Y/C
P0301
6VA 1
12VA 2
SYNC "H" 3
AFC SYNC 4
TITLE REG 5
GND 6
TITLE V OUT 7
GND 8
OSD V IN 9
GND 10
TITLE V IN 11
GND 12
OSD V OUT 13
L005 100U
C022 220/16
C023 CJ223
R073 33K
R017 10K
1/32
32fh VCO
Phase DET
SYNC DET
V.SYNC SEPA
SYNC SEPA
NJM2229
C021 CQ222
C020 680P
C019 1/50
L065 100U
C068 47/16
C069 CJ223
R009 4.7K
R008 4.7K
Q007 KN2203
001 NJM2249L
BIAS
BUFFER
B+
GND
D004 1SS131
Q008 KN1203
Q005 KN2203
Q006 KN1203
L064 100U
D003 1SS131
D005 1SS131
C001 1/50
R010 5.6K
L001 100U
R066 100
R001 8.2K
R003 8.2K
C002 CJ223
C003 47/16
R012 22K
C007 4.7/50
C066 47/16
C067 CJ223
Q012 KN1203
C028 100P
R020 680K
C065 1/50 (BP)
C025 1/50
C027 1/50
R019 1.5K
C026 CQ104
C024 CQ332
R018 390
X002 CSB500F9
R064 1K
R065 1K
Q061 KN1203
Q062 KN1203
R072 2.7K
R071 1.8K
C004 100/16
R070 560
D009 1SS131
Q011 C1815BL
C010 22P
C011 22P
X001 17.73M
Q003 C1815BL
D006 1SS131
R063 5.6K
R006 470
R005 470K
C072 47/16
R004 68K
C006 100/16
R026
Q001 A1015GR
Q002 C1815BL
R024 4.7K
Q009 C1815BL
R062 3.3K
R007 220K
R013 56
R011 2.2K
R074 18K
D002 1SS131
L004 100U
C008 CJ223
L002 100U
C009 47/16
IC002 M35010
VDD1 VERT HOR OSC IN OSC OUT P3 P2 P1 P0 Vss
OSC1 OSC2 CS SCK SIN AC VDD2 V/OUT LECHA V/IN
Q010 C1815BL
TO/FROM SYSCON
P0501
OSD DATA 1
OSD CLK 2
GND 3
OSD CS 4
GND 5
NICAM DATA 6
NICAM ID 7
TO NICAM BOARD
NICAM ID
NICAM DATA
L003 12U
C014 68P
C015 100P
C060 22U
C060 100P
L061 22U
L062 22U
C016 CJ223
C013 3P
C061 100P
C062 47P
R061 1K
L063 33U
Q060 C1815BL
C063 CJ223
R014 2.2K
R015 4.7K
C070 CJ223
C017 47/16
C071 100/16
C.VIDEO
OSD DATA
TITLE CH

The defect in the X001.
F.OSD screen doesn't appear.

The defect in the Q001, Q010.
TV screen doesn't appear.

LOCA No	Position
IC001	4F
IC002	2C
IC003	4C
Q001	2D
Q002	2E
Q003	3D
Q005	4E
Q006	4D
Q007	4E
Q008	4D
Q009	2D
Q010	2B
Q011	3B
Q012	3D
Q060	2D
Q061	3B
Q062	3B

* Function OSD/Title IC Voltage Sheet

IC 001 (NJM2249L)

1				5			
5.08	0.05	5.36	0.05	5.29	11.71	4.35	0

IC 002 (M35010)

20					15				
5.11	4.89	4.56	2.36	2.36	0.01	0.01	0.01	0.01	0

1				5					10
2.43	2.42	5.01	5.01	5.01	5.09	5.01	2.43	3.64	2.38

IC 003 (NJM2229)

	15					10	
0.32	4.98	0.02	4.23	1.86	0.58	0.09	0.20

1				5			
2.67	2.13	2.20	0.01	0.72	3.13	2.44	0

* Function OSD/Title TR Voltage Sheet

TR No. \ Port	Emitter	Collector	Base
Q001	4.61	0	3.92
Q002	2.36	11.70	2.36
Q003	0	4.61	0.15
Q005	5.01	0	5.03
Q006	0	5.03	0
Q007	5.01	0	5.03
Q008	0	5.03	0
Q060	2.65	2.65	3.30
Q061	0	4.56	0.32
Q062	0	4.89	0.09

10. Pre-Amp Circuit Diagram

SP mode PB(REC)

0 (0)	0 (0)	0 (0)	0.74 (0)	0.65 (0)	0 (0)	0.65 (0)	0.74 (0)	0 (4.27)	0 (4.27)	5.05 (4.98)

20 15

IC 851 (BA7740S)

1 5 10

0.33 (6.0)	0.49 (1.37)	5.05 (2.77)	5.05 (4.98)	0.02 (0)	5.06 (4.98)	2.39 (3.60)	3.02 (2.97)	5.06 (4.98)	0 (0.02)	2.53 (0.01)

LP mode PB(REC)

0 (0)	0 (0)	0 (0)	0.74 (0)	0.65 (0)	0 (0)	0.65 (0)	0.74 (0)	0 (4.27)	4.67 (4.27)	5.05 (4.98)

20 15

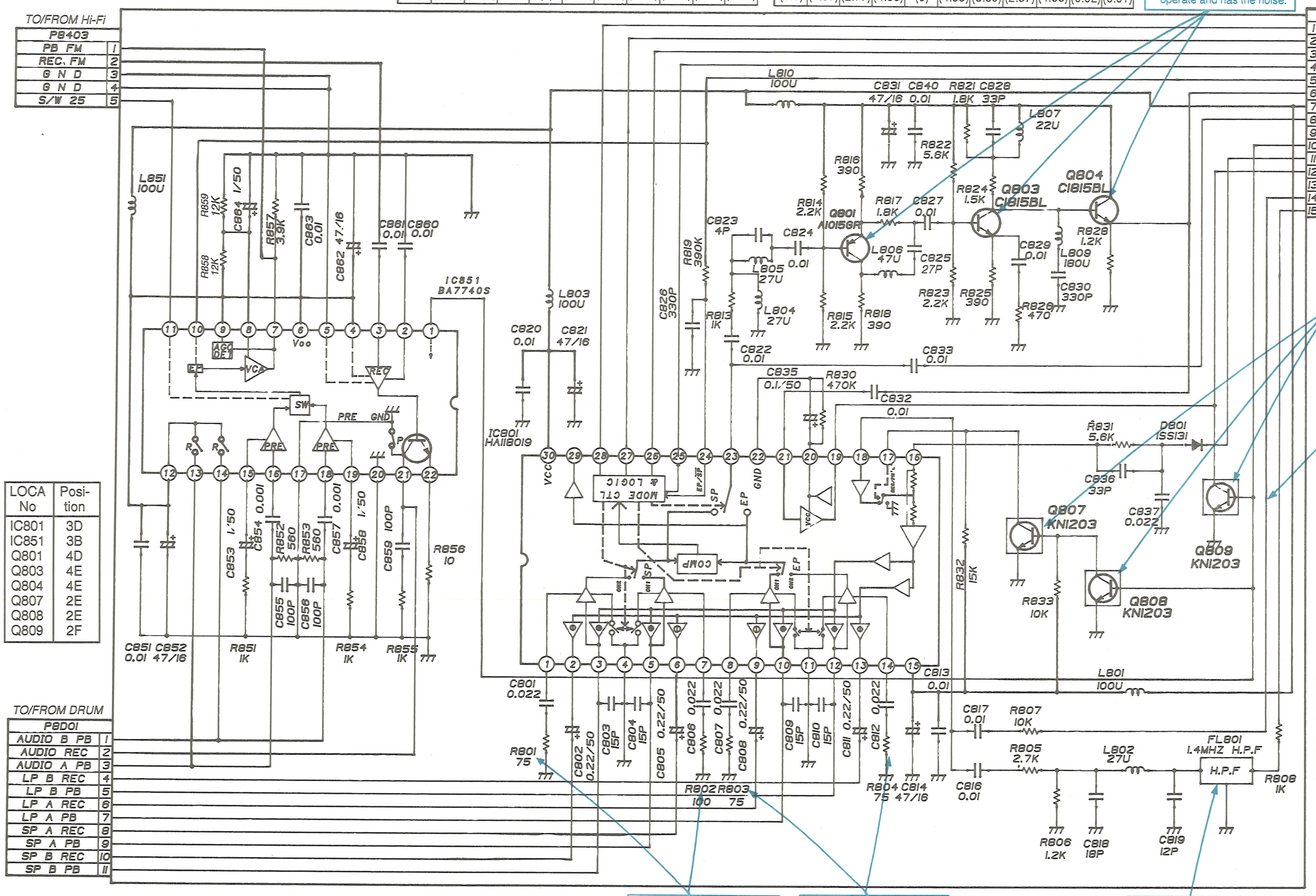
IC 851 (BA7740S)

1 5 10

0.33 (6.0)	0.50 (1.37)	2.82 (2.77)	5.05 (4.98)	0 (0)	5.05 (4.98)	2.70 (3.60)	5.05 (2.97)	5.05 (4.98)	5.11 (0.02)	2.53 (0.01)

The defect in the Q801, Q803, Q804.

- In the playback mode, RF level is low.
- In the playback mode, the screen has much noise.
- The playback doesn't operate and has the noise.


TO/FROM Hi-Fi
P8403
PB FM 1
REC. FM 2
G N D 3
G N D 4
S/W 25 5
TO/FROM Y/C
PB302
1 D/A
2 C.SYNC
3 S/W 25
4 ROT. SW
5 SP "L"
6 ATR FM
7 5V
8 PB COLOR
9 G N D
10 REC S "H"
11 SLOW "L"
12 PB FM
13 G N D
14 REC COLOR
15 REC Y
TO/FROM DRUM
PB801
AUDIO B PB 1
AUDIO REC 2
AUDIO A PB 3
LP B REC 4
LP B PB 5
LP A REC 6
LP A PB 7
SP A REC 8
SP A PB 9
SP B REC 10
SP B PB 11
L851 100U
R859 12K
R858 12K
C864 1/50
R857 3.9K
C863 0.01
C862 47/16
C861 0.01
C860 0.01
IC851 BA7740S
AGC DET
VCA
EQ
REC
SW
PRE
GND
Vcc
C853 1/50
C854 0.001
R852 560
R853 560
C857 0.001
C858 1/50
C859 100P
R856 10
C855 100P
C856 100P
C851 0.01
C852 47/16
R851 1K
R854 1K
R855 1K
L810 100U
C831 47/16
C840 0.01
R821 1.8K
C828 33P
L807 22U
R822 5.6K
R816 390
R814 2.2K
Q801 A1015GR
R817 1.8K
C827 0.01
R824 1.5K
Q803 C1815BL
Q804 C1815BL
R828 1.2K
C823 4P
C824
L806 47U
C825 27P
C829 0.01
L809 180U
C830 330P
R819 390K
L805 27U
C801 0.01
R823 2.2K
R825 390
R826 470
C826 330P
R813 1K
L804 27U
R815 2.2K
R818 390
L803 100U
C820 0.01
C821 47/16
C822 0.01
C833 0.01
C835 0.1/50
R830 470K
C832 0.01
IC801 HA118019
VCC
MODE CTL
LOGIC
EP/SP
SP
EP
GND
COMP
R831 5.6K
D801 1SS131
C836 33P
C837 0.022
Q807 KN1203
Q809 KN1203
Q808 KN1203
R832 15K
R833 10K
C801 0.022
R801 75
C802 0.22/50
C803 15P
C804 15P
C805 0.22/50
C806 0.022
C807 0.022
C808 0.22/50
C809 15P
C810 15P
C811 0.22/50
C812 0.022
C813 0.01
R802 100
R803 75
R804 75
C814 47/16
C817 0.01
R807 10K
R805 2.7K
C816 0.01
L802 27U
FL801 1.4MHZ H.P.F
H.P.F
R808 1K
L801 100U
R806 1.2K
C818 18P
C819 12P
5
4
3
2
1
A
B
C
D
E
F
G
H

LOCA No	Posi-tion
IC801	3D
IC851	3B
Q801	4D
Q803	4E
Q804	4E
Q807	2E
Q808	2E
Q809	2F

The defect in the R801, R802.

RF level has much value and oscillate in the SP mode.

The defect in the R803, R804.

RF level has much value and oscillate in the LP mode.

The defect in the FL801.

Recording is failed.

The defect in the Q807, Q808, Q809.

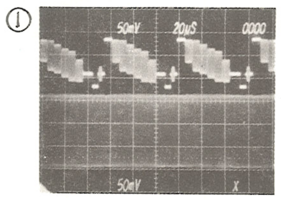
Recording is failed.

Pattern open.

After recording, color signal doesn't appear in the playback mode.

＊ Pre-Amp Waveform

<When taking a photograph of waveform, set probe of oscilloscope to 10:1>



W811. Record Current (50mV/20μsec)

＊ Pre-Amp TR Voltage Sheet

(PB/REC mode)

TR No. \ Port	Emitter	Collector	Base
Q801	3.29/3.27	1.82/1.80	1.62/2.61
Q803	0.81/0.80	0/1.92	1.44/1.43
Q804	1.36/1.32	5.09/5.06	1.92/1.92
Q807	0/0	0/2.23	0/0
Q808	0/0	0.02/0	0/5.0
Q809	0/0	0/0	0.33/5.0

＊ Pre-Amp IC Voltage Sheet

SP mode PB(REC)

5.05 (5.03)	1.99 (3.82)	4.72 (4.78)	0.25 (0.25)	1.26 (1.26)	2.20 (2.21)	0.11 (0.1)	0 (4.35)	0 (0)	2.84 (3.14)	2.24 (0.09)	2.48 (0.03)	4.10 (4.05)	0 (2.23)	2.67 (2.74)

30 25 20

IC 801 (HA118019)

1 5 10 15

2.33 (4.25)	0 (2.19)	0.68 (2.16)	0 (0)	0.68 (2.18)	0 (2.2)	2.27 (4.25)	4.23 (4.26)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	4.23 (4.26)	5.01 (4.84)

LP mode PB(REC)

5.05 (5.03)	2.00 (3.84)	4.73 (4.78)	0.25 (0.25)	1.26 (1.26)	2.22 (2.22)	4.91 (4.9)	3.05 (4.35)	0 (0)	2.84 (3.14)	2.21 (0.09)	2.52 (0)	4.09 (4.05)	0 (2.23)	2.68 (2.74)

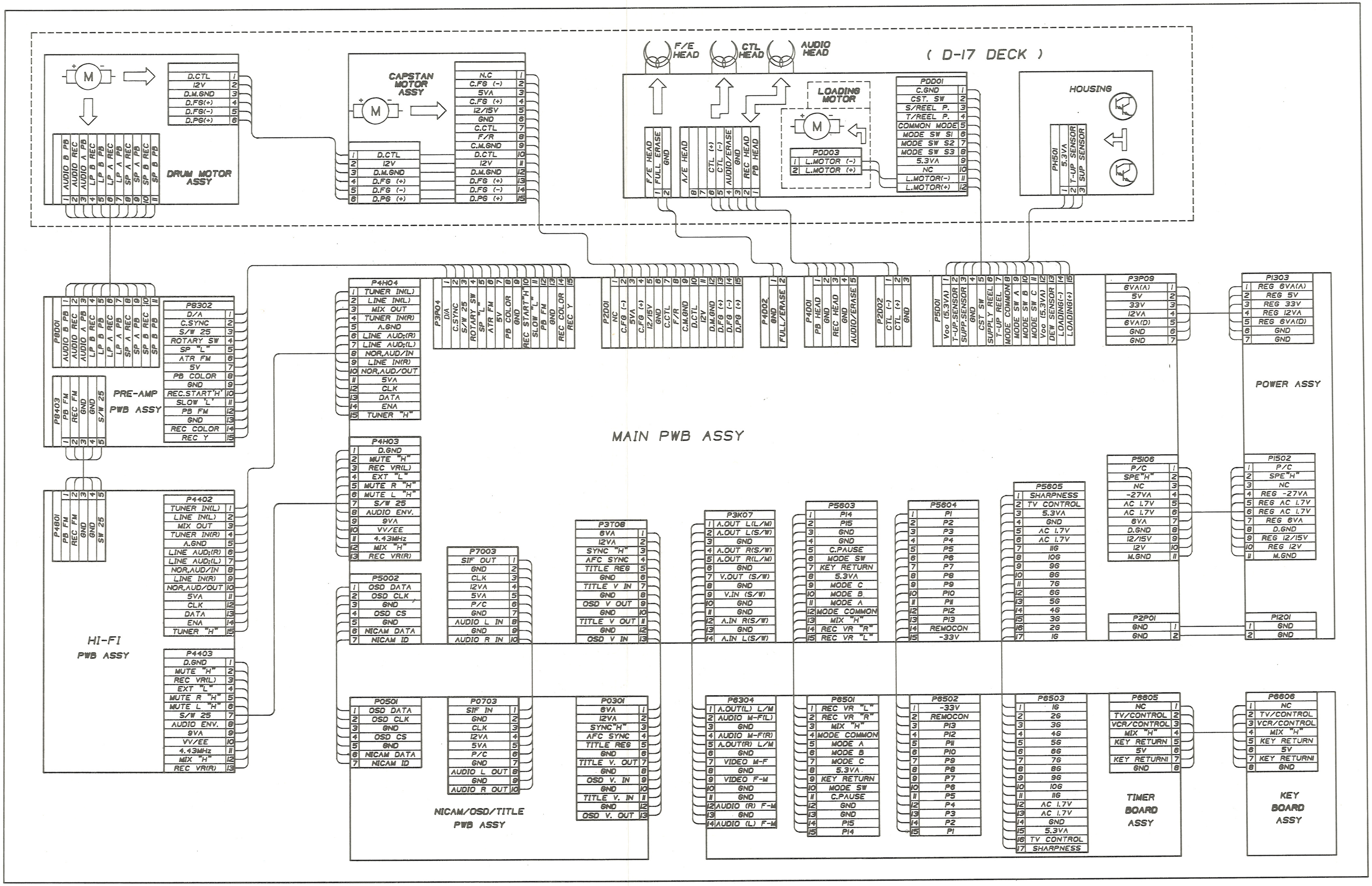
30 25 20

IC 801 (HA118019)

1 5 10 15

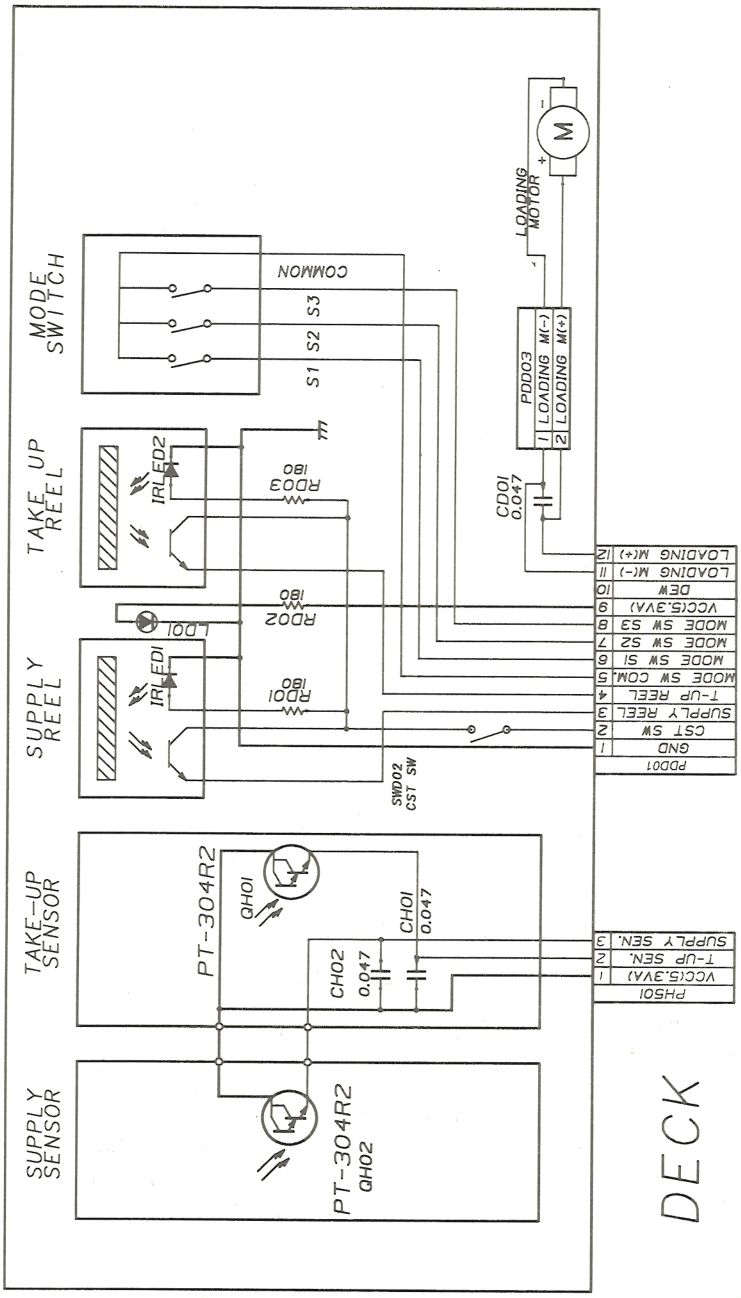
4.22 (4.26)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	4.21 (4.26)	2.28 (4.26)	0 (2.11)	0.68 (2.10)	0 (0)	0.68 (2.11)	0 (2.13)	2.27 (4.17)	5.02 (4.84)

11. Connection Diagram

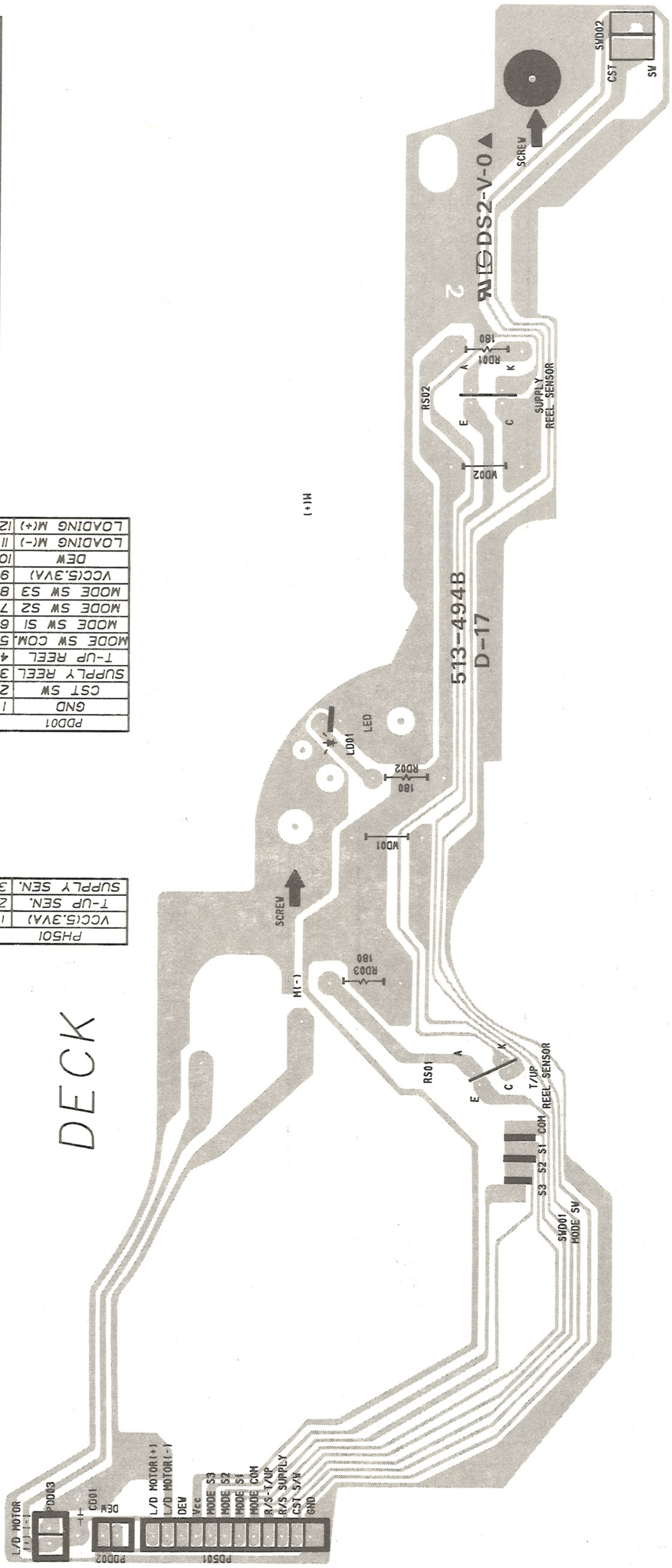

(D-17 DECK)
DRUM MOTOR ASSY
D.CTL 1, 12V 2, D.M.GND 3, D.FG(+) 4, D.FG(-) 5, D.PG(+) 6
AUDIO B PB 1, AUDIO REC 2, AUDIO A PB 3, LP B REC 4, LP B PB 5, LP A REC 6, LP A PB 7, SP A REC 8, SP A PB 9, SP B REC 10, SP B PB 11
CAPSTAN MOTOR ASSY
D.CTL 1, 12V 2, D.M.GND 3, D.FG (+) 4, D.FG (-) 5, D.PG (+) 6
N.C 1, C.FG (-) 2, 5VA 3, C.FG (+) 4, 12/15V 5, GND 6, C.CTL 7, F/R 8, C.M.GND 9, D.CTL 10, 12V 11, D.M.GND 12, D.FG (+) 13, D.FG (-) 14, D.PG (+) 15
F/E HEAD
CTL HEAD
AUDIO HEAD
F/E HEAD 1, FULL ERASE 2, GND 3
A/E HEAD 8, CTL (+) 7, CTL (-) 6, AUDIO/ERASE 5, GND 4, REC HEAD 3, PB HEAD 2, 1
LOADING MOTOR
PD003: L.MOTOR (-) 1, L.MOTOR (+) 2
PD001: C.GND 1, CST. SW 2, S/REEL P. 3, T/REEL P. 4, COMMON MODE 5, MODE SW S1 6, MODE SW S2 7, MODE SW S3 8, 5.3VA 9, NC 10, L.MOTOR(-) 11, L.MOTOR(+) 12
HOUSING
PH501: 5.3VA 1, T-UP SENSOR 2, SUP SENSOR 3
P8D01: AUDIO B PB 1, AUDIO REC 2, AUDIO A PB 3, LP B REC 4, LP B PB 5, LP A REC 6, LP A PB 7, SP A REC 8, SP A PB 9, SP B REC 10, SP B PB 11
P8302: D/A 1, C.SYNC 2, S/W 25 3, ROTARY SW 4, SP "L" 5, ATR FM 6, 5V 7, PB COLOR 8, GND 9, REC.START"H" 10, SLOW "L" 11, PB FM 12, GND 13, REC COLOR 14, REC Y 15
P8403: PB FM 1, REC FM 2, GND 3, GND 4, S/W 25 5
PRE-AMP PWB ASSY
P4801: PB FM 1, REC FM 2, GND 3, GND 4, SW 25 5
P4402: TUNER IN(L) 1, LINE IN(L) 2, MIX OUT 3, TUNER IN(R) 4, A.GND 5, LINE AUD;(R) 6, LINE AUD;(L) 7, NOR.AUD/IN 8, LINE IN(R) 9, NOR.AUD/OUT 10, 5VA 11, CLK 12, DATA 13, ENA 14, TUNER "H" 15
P4403: D.GND 1, MUTE "H" 2, REC VR(L) 3, EXT "L" 4, MUTE R "H" 5, MUTE L "H" 6, S/W 25 7, AUDIO ENV. 8, 9VA 9, VV/EE 10, 4.43MHz 11, MIX "H" 12, REC VR(R) 13
HI-FI PWB ASSY
P4H04: TUNER IN(L) 1, LINE IN(L) 2, MIX OUT 3, TUNER IN(R) 4, A.GND 5, LINE AUD;(R) 6, LINE AUD;(L) 7, NOR.AUD/IN 8, LINE IN(R) 9, NOR.AUD/OUT 10, 5VA 11, CLK 12, DATA 13, ENA 14, TUNER "H" 15
P4H03: D.GND 1, MUTE "H" 2, REC VR(L) 3, EXT "L" 4, MUTE R "H" 5, MUTE L "H" 6, S/W 25 7, AUDIO ENV. 8, 9VA 9, VV/EE 10, 4.43MHz 11, MIX "H" 12, REC VR(R) 13
P3P04: D/A 1, C.SYNC 2, S/W 25 3, ROTARY SW 4, SP "L" 5, ATR FM 6, 5V 7, PB COLOR 8, GND 9, REC START"H" 10, SLOW "L" 11, PB FM 12, GND 13, REC COLOR 14, REC Y 15
P2D01: NC 1, C.FG (-) 2, 5VA 3, C.FG (+) 4, 12/15V 5, GND 6, C.CTL 7, F/R 8, C.M.GND 9, D.CTL 10, 12V 11, D.M.GND 12, D.FG (+) 13, D.FG (-) 14, D.PG (+) 15
P4D02: GND 1, FULL/ERASE 2
P4D01: PB HEAD 1, GND 2, REC HEAD 3, GND 4, AUDIO/ERASE 5
P2D02: CTL (-) 1, CTL (+) 2, GND 3
P5D01: Vcc (5.3VA) 1, T-UP.SENSOR 2, SUPP.SENSOR 3, GND 4, CST SW 5, SUPPLY REEL 6, T-UP REEL 7, MODE COMMON 8, MODE SW A 9, MODE SW B 10, MODE SW C 11, Vcc (5.3VA) 12, DEW SENSOR 13, LOADING(-) 14, LOADING(+) 15
P3P09: 6VA(A) 1, 5V 2, 33V 3, 12VA 4, 6VA(D) 5, GND 6, GND 7
P1303: REG 6VA(A) 1, REG 5V 2, REG 33V 3, REG 12VA 4, REG 6VA(D) 5, GND 6, GND 7
POWER ASSY
MAIN PWB ASSY
P5106: P/C 1, SPE"H" 2, NC 3, -27VA 4, AC 1.7V 5, AC 1.7V 6, 6VA 7, D.GND 8, 12/15V 9, 12V 10, M.GND 11
P1502: P/C 1, SPE"H" 2, NC 3, REG -27VA 4, REG AC 1.7V 5, REG AC 1.7V 6, REG 6VA 7, D.GND 8, REG 12/15V 9, REG 12V 10, M.GND 11
P2P01: GND 1, GND 2
P1201: GND 1, GND 2
P5002: OSD DATA 1, OSD CLK 2, GND 3, OSD CS 4, GND 5, NICAM DATA 6, NICAM ID 7
P7003: SIF OUT 1, GND 2, CLK 3, 12VA 4, 5VA 5, P/C 6, GND 7, AUDIO L IN 8, GND 9, AUDIO R IN 10
P3T08: 6VA 1, 12VA 2, SYNC "H" 3, AFC SYNC 4, TITLE REG 5, GND 6, TITLE V IN 7, GND 8, OSD V OUT 9, GND 10, TITLE V OUT 11, GND 12, OSD V IN 13
P3K07: A.OUT L(L/M) 1, A.OUT L(S/W) 2, GND 3, A.OUT R(S/W) 4, A.OUT R(L/M) 5, GND 6, V.OUT (S/W) 7, GND 8, V.IN (S/W) 9, GND 10, GND 11, A.IN R(S/W) 12, GND 13, A.IN L(S/W) 14
P5603: P14 1, P15 2, GND 3, GND 4, C.PAUSE 5, MODE SW 6, KEY RETURN 7, 5.3VA 8, MODE C 9, MODE B 10, MODE A 11, MODE COMMON 12, MIX "H" 13, REC VR "R" 14, REC VR "L" 15
P5604: P1 1, P2 2, P3 3, P4 4, P5 5, P6 6, P7 7, P8 8, P9 9, P10 10, P11 11, P12 12, P13 13, REMOCON 14, -33V 15
P5605: SHARPNESS 1, TV CONTROL 2, 5.3VA 3, GND 4, AC 1.7V 5, AC 1.7V 6, 11G 7, 10G 8, 9G 9, 8G 10, 7G 11, 6G 12, 5G 13, 4G 14, 3G 15, 2G 16, 1G 17
P0501: OSD DATA 1, OSD CLK 2, GND 3, OSD CS 4, GND 5, NICAM DATA 6, NICAM ID 7
P0703: SIF IN 1, GND 2, CLK 3, 12VA 4, 5VA 5, P/C 6, GND 7, AUDIO L OUT 8, GND 9, AUDIO R OUT 10
P0301: 6VA 1, 12VA 2, SYNC"H" 3, AFC SYNC 4, TITLE REG 5, GND 6, TITLE V. OUT 7, GND 8, OSD V. IN 9, GND 10, TITLE V. IN 11, GND 12, OSD V. OUT 13
NICAM/OSD/TITLE PWB ASSY
P8304: A.OUT(L) L/M 1, AUDIO M-F(L) 2, GND 3, AUDIO M-F(R) 4, A.OUT(R) L/M 5, GND 6, VIDEO M-F 7, GND 8, VIDEO F-M 9, GND 10, GND 11, AUDIO (R) F-M 12, GND 13, AUDIO (L) F-M 14
P6501: REC VR "L" 1, REC VR "R" 2, MIX "H" 3, MODE COMMON 4, MODE A 5, MODE B 6, MODE C 7, 5.3VA 8, KEY RETURN 9, MODE SW 10, C.PAUSE 11, GND 12, GND 13, P15 14, P14 15
P6502: -33V 1, REMOCON 2, P13 3, P12 4, P11 5, P10 6, P9 7, P8 8, P7 9, P6 10, P5 11, P4 12, P3 13, P2 14, P1 15
P6503: 1G 1, 2G 2, 3G 3, 4G 4, 5G 5, 6G 6, 7G 7, 8G 8, 9G 9, 10G 10, 11G 11, AC 1.7V 12, AC 1.7V 13, GND 14, 5.3VA 15, TV CONTROL 16, SHARPNESS 17
P6605: NC 1, TV/CONTROL 2, VCR/CONTROL 3, MIX "H" 4, KEY RETURN 5, 5V 6, KEY RETURN1 7, GND 8
TIMER BOARD ASSY
P6606: NC 1, TV/CONTROL 2, VCR/CONTROL 3, MIX "H" 4, KEY RETURN 5, 5V 6, KEY RETURN1 7, GND 8
KEY BOARD ASSY
1 2 3 4 5
A B C D E F G H

DECK JUNCTION

1. Deck Junction Circuit Diagram


MODE SWITCH
COMMON
S1 S2 S3
TAKE UP REEL
IRLED2
RD03 180
SUPPLY REEL
IRLED1
RD01 180
RD02 180
LD01
SWD02 CST SW
LOADING MOTOR
M
PDD03
1 LOADING M(-)
2 LOADING M(+)
CD01 0.047
PDD01
1 GND
2 CST SW
3 SUPPLY REEL
4 T-UP REEL
5 MODE SW COM.
6 MODE SW S1
7 MODE SW S2
8 MODE SW S3
9 VCC(5.3VA)
10 DEW
11 LOADING M(-)
12 LOADING M(+)
TAKE-UP SENSOR
PT-304R2
QH01
CH01 0.047
CH02 0.047
PH501
1 VCC(5.3VA)
2 T-UP SEN.
3 SUPPLY SEN.
SUPPLY SENSOR
PT-304R2
QH02
DECK

2. Deck Junction P.C.Board


SWD02
CST
SW
SCREW
DS2-V-0
RD01 180
RS02
SUPPLY REEL SENSOR
WD02
M(+)
513-494B
D-17
LD01
LED
RD02 180
WD01
SCREW
RD03 180
M(-)
RS01
T/UP REEL SENSOR
S3 S2 S1 COM
SWD01 MODE SW
L/D MOTOR
PDD03
CD01
DEW
L/D MOTOR(+)
L/D MOTOR(-)
Vcc
MODE S3
MODE S2
MODE S1
MODE COM
R/S-T/UP
R/S SUPPLY
CST S/W
GND
PDD02
PD501

(Solder Side)

* TR Voltage Sheet

Port / TR No.	Emitter	Collector	Base	Remark
Q001	4.61	0	3.92	
Q002	2.36	11.70	2.36	
Q003	0	4.61	0.15	
Q005	5.01	0	5.03	
Q006	0	5.03	0	
Q007	5.01	0	5.03	
Q008	0	5.03	0	
Q060	2.65	2.65	3.30	
Q061	0	4.56	0.32	
Q062	0	4.89	0.09	
Q201	5.10/5.09	1.21/1.20	5.01/5.01	
Q202	5.10/5.09	1.21/1.20	5.01/5.02	
Q203	5.10/5.09	2.73/2.73	5.01/5.02	
Q204	0.01/0.01	2.75/2.75	0.01/0	
Q205	0/0.01	5.09/5.09	0.01/0	
Q206	0/0	0.01/0.01	3.5/3.5	
Q207	0/0	5.09/5.09	0.01/0.01	
Q301	0/0	0/0	0.02/0.01	SP mode
	0/0	0/0	5.05/5.05	LP mode
Q302	0/0	0/0	0/0	SP mode
	0/0	0/0	5.05/5.05	LP mode
Q303	0/0	0/0	4.96/0	
Q304	3.39/3.03	0/0	2.78/2.41	
Q305	4.0/3.64	0/0	3.4/3.03	
Q306	0/0	0/0	5.04/0	
Q307	0/0	4.55/4.54	0.12/0.11	
Q308	1.17/0	5.05/0	1.78/0	
Q309	2.79/0	5.03/0	3.40/0	
Q310	0.89/0	1.56/0	1.51/0	
Q311	0.95/0	5.03/0	1.56/0	
Q312	0/0	0/5.1	5.09/0	
Q313	5.11/5.1	5.05/0	4.32/5.1	
Q314	1.0/0.63	0/0	0.39/0	
Q315	2.01/0	0/0	1.38/0	
Q316	2.8/0	5.01/0	3.41/0	
Q317	3.75/3.74	0/0	3.06/3.05	
Q318	0/0	0/0	4.94/4.96	
Q321	0/0	0/0	5.01/5.01	SP mode
	0/0	5.11/5.1	0/0	LP mode
Q401	0/0	0/8.9	5/0	
Q402	0/0	6.5/0	0.35/5.0	
Q403	0/0	0/0.7	6.3/0	
Q405	0/0.5	9.1/8.8	0/1.0	
Q406	0/0	0/1.0	5/0	
Q407	9.2/9.2	12/12	9.8/9.8	
Q408	0/0.33	9.1/8.9	0/0.7	
Q451	0/0	5.2/5.2	0.5/0	
Q452	0/0	0/0	5.2/5.2	
Q453	0/0	0.1/0.1	0.1/0.1	
Q454	0/0	0.1/0.1	0.1/0.1	
Q455	1.6/1.6	6.7/6.7	2.2/2.2	
Q501	0.01/0.01	0.01/0.01	5.10/5.10	
Q502	0.01/0.01	Pulse	Pulse	
Q503	0.01/0.01	Pulse	Pulse	
Q504	5.18/5.17	0.02/0.02	5.11/5.12	
Q505	10.97/1.87	0/0	11.44/1.68	
Q506	0.01/0	5.17/5.16	0/0.01	
Q507	12.01/11.97	12.01/0.10	11.26/11.97	
Q508	0/0	0.08/11.97	4.47/0	
Q602	0.01/0.01	Pulse	Pulse	
Q603	0.01/0.01	Pulse	Pulse	
Q701	1.97	12.08	2.67	
Q702	1.93	10.22	2.54	
Q703	1.30	12.17	1.93	
Q704	12.28	12.19	11.55	
Q705	0	0.07	4.98	
Q7A1	3.80	9.42	4.43	
Q7A2	3.80	9.42	4.43	
Q801	3.29/3.27	1.82/1.80	1.62/2.61	
Q803	0.81/0.80	0/1.92	1.44/1.43	
Q804	1.36/1.32	5.09/5.06	1.92/1.92	
Q807	0/0	0/2.23	0/0	
Q808	0/0	0.02/0	0/5.0	
Q809	0/0	0/0	0.33/5.0	

* IC Voltage Sheet

IC501 (M38174M8)

	PB	(REC)
40	4.98	(0.01)
	2.55	(2.55)
	0.01	(5.07)
	0.01	(0.01)
	0.01	(0.01)
35	5.01	(5.01)
	5.01	(5.01)
	5.01	(5.01)
	0.01	(0.01)
	1.98	(1.99)
30	2.30	(2.31)
	2.44	(2.43)
	2.42	(2.43)
	5.04	(2.03)
	2.00	(3.67)
25	4.87	(4.86)

	PB	(REC)
25	2.55	(2.55)
	Pluse	Pluse
	Pluse	Pluse
	5.01	(0.01)
20	0.04	(0.04)
	0.03	(0.03)
	5.01	(5.00)
	1.96	(5.07)
	3.67	(3.67)
15	4.26	(0.06)
	0.01	(4.79)
	0.01	(5.01)
	0.01	(0.07)
	5.05	(5.03)
10	5.04	(0.01)
	5.04	(0.13)
	0.01	(0.15)
	0	(0.12)
	0.01	(0.01)
5	5.00	(0.01)
	0	(0.01)
	0	(0.01)
	Pulse	(Pulse)
1	5.00	(0.01)

	PB	(REC)
40	-24.3	(-24.5)
	-24.3	(-24.5)
	-24.3	(-24.5)
	-24.3	(-24.5)
45	-24.3	(-24.5)
	-24.3	(-24.5)
	-24.3	(-24.5)
	-24.3	(-24.5)
	-24.3	(-24.5)
50	-24.3	(-24.5)
	-24.3	(-24.5)
	-18.4	(-15.8)
	-27.0	(-27.2)
	-27.0	(-27.2)
55	-24.3	(-24.5)
	-18.4	(27.2)
	-12.8	(15.8)
	-24.3	(24.5)
	-21.3	(21.6)
60	-27.0	(27.2)
	-27.2	(24.3)
	-27.2	(-27.2)
	-18.4	(-18.5)
65	-21.5	(-27.2)

	PB	(REC)
65	-7.90	-10.01
	-9.92	(12.9)
	0.56	(0)
	1.18	(0)
	5.01	(0.01)
70	5.02	(0.01)
	0.34	(-5.01
	0.61	(-0.61
	5.03	(-5.03
	-27.4	-27.6
75	0	(0)
	5.26	(5.26)
	00.14	(0.14)
	4.85	(4.85)
	3.85	(3.85)
1	2.15	(0.17)

IC 502 (X24C01)

PB(REC)

			5
5.01 (5.01)	0.01 (0.01)	5.01 (4.97)	5.01 (4.97)

1			
0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)

IC 503 (TC4094BP)

PB (REC)

	15					10	
5.30 (5.30)	0 (5.17)	0 (0)	5.10 (5.10)	0 (0)	5.09 (5.09)	4.12 (5.09)	4.11 (5.08)

1				5			
0.02 (0.02)	1.74 (0.21)	1.65 (0.08)	0 (0)	0 (0)	5.10 (0)	0 (5.17)	0.01 (0)

IC 504 (PST523G)

PB(REC)

1		
5.03 (5.03)	0 (0)	5.04 (5.04)

IC 505 (GL7445)

PB(REC)

1				5					10
0.01 (0.02)	0.56 (0.57)	0.80 (0.81)	0.92 (0.36)	1.79 (1.79)	1.78 (1.78)	12.03 (11.9)	12.03 (11.9)	0.81 (0.82)	0.56 (0.57)

IC201(HD49756NT)

PB(REC)

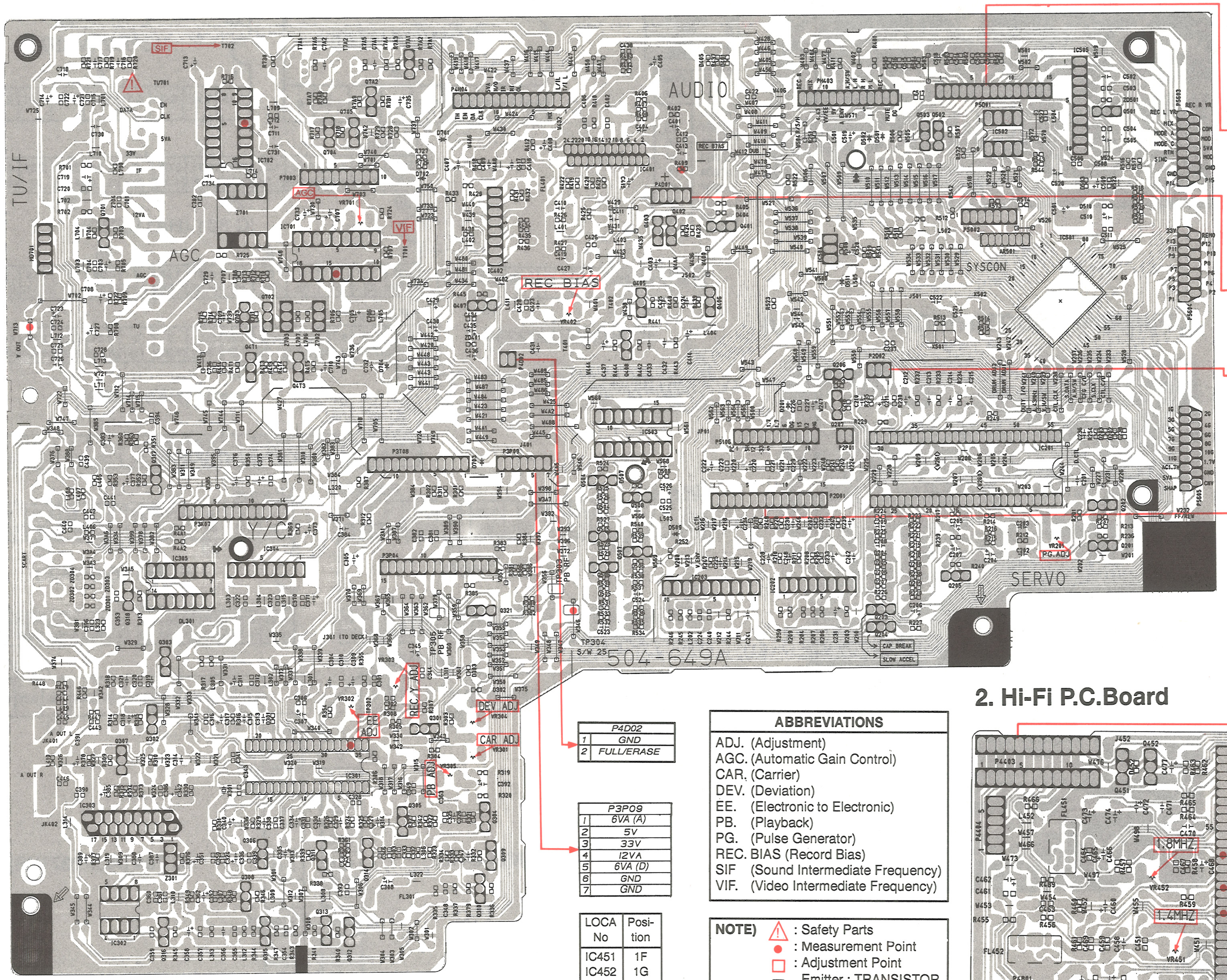
	PB	(REC)
	1.95	(5.07)
55	2.55	(2.55)
	0.75	(0.75)
	2.25	(2.25)
	5.06	(5.03)
	5.10	(5.09)
50	.0.12	(0.52)
	0.03	(0.04)
	0.01	(0.01)
	2.55	(2.55)
	2.56	(0.01)
45	2.56	(2.55)
	2.64	(2.63)
	2.63	(2.63)
	2.63	(2.63)
	5.08	(5.07)
40	5.08	(5.07)
	1.98	(3.68)
	5.10	(5.09)
	2.71	(2.71)
	2.53	(2.53)
35	2.55	(2.55)
	2.55	(2.55)
	2.55	(2.55)
	2.55	(2.55)
	0	(0.01)
30	2.55	(2.80)
	0.01	(2.14)

	PB	(REC)
1	3.68	(3.68)
	0.01	(0.01)
	0.01	(0.01)
	5.04	(5.04)
5	0.01	(0)
	0.29	(0.02)
	2.11	(2.11)
	0	(0.01)
	2.67	(2.67)
10	2.67	(2.67)
	2.68	(2.68)
	1.32	(1.32)
	2.55	(2.55)
	2.56	(2.68)
15	2.57	(2.56)
	2.56	(2.55)
	2.56	(2.58)
	2.42	(2.42)
	0	(0.01)
20	2.58	(2.58)
	2.58	(2.57)
	2.58	(2.57)
	2.58	(2.57)
	2.58	(2.57)
25	2.57	(2.57)
	2.67	(2.67)
	2.70	(2.67)
	5.10	(5.10)

PRINTED CIRCUIT BOARD DIAGRAMS

1. Main P.C.Board

5
4
3
2
1


SIF
TU/IF
AGC
VIF
AUDIO
REC BIAS
SYSCON
Y/C
SERVO
PG.ADJ
DEV ADJ
CAR ADJ
ADJ
REC Y ADJ
PB ADJ
504-649A

P5D01	
1	Vcc (5.3VA)
2	T-UP.SENSOR
3	SUPP.SENSOR
4	GND
5	CST SW
6	SUPPLY REEL
7	T-UP REEL
8	MODE COMMON
9	MODE SW A
10	MODE SW B
11	MODE SW C
12	Vcc (5.3VA)
13	DEW SENSOR
14	LOADING(-)
15	LOADING(+)

P4D01	
1	PB HEAD
2	GND
3	REC HEAD
4	GND
5	AUDIO/ERASE

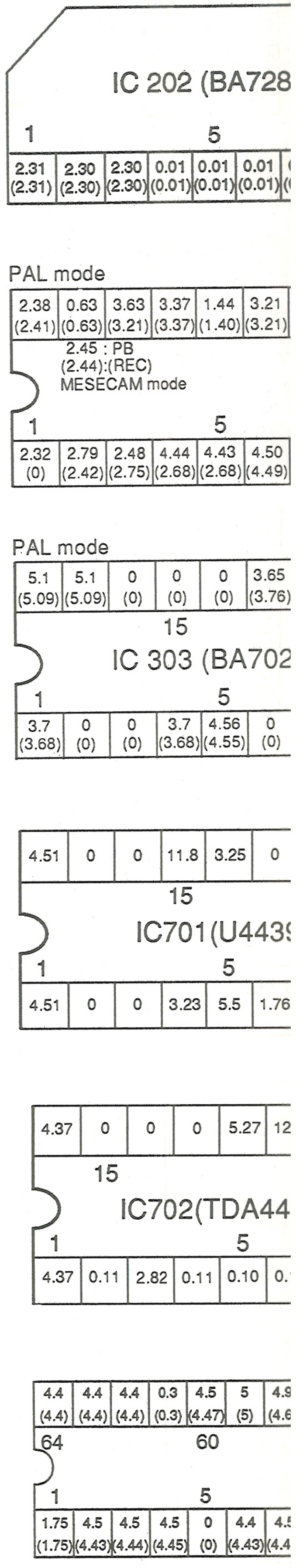
P2D02	
1	CTL (-)
2	CTL (+)
3	GND

P2D01	
1	NC
2	C.FG (-)
3	5VA
4	C.FG (+)
5	12/15V
6	GND
7	C.CTL
8	F/R
9	C.M.GND
10	D.CTL
11	12V
12	D.M.GND
13	D.FG (+)
14	D.FG (-)
15	D.PG (+)

LOCA No	Posi-tion
IC201	3E
IC202	3D
IC203	3D
IC301	2B
IC302	1A
IC303	2A
IC304	3B
IC305	3B
IC401	4C
IC402	4C
IC501	4E
IC502	4E
IC503	3C
IC504	4D
IC505	5E
IC701	4B
IC702	4B
Q201	3E
Q202	3E
Q203	2E
Q204	2E
Q205	3E
Q301	2C
Q302	2A
Q303	2A
Q304	2C
Q305	1B
Q306	2B
Q307	2A
Q308	1B
Q309	1C
Q310	1C

LOCA No	Posi-tion
Q311	1B
Q312	1B
Q313	1B
Q314	1B
Q315	1B
Q316	1A
Q317	3A
Q318	3A
Q321	2C
Q401	4D
Q402	4D
Q403	4D
Q405	4C
Q406	4D
Q407	4C
Q408	4C
Q501	5E
Q502	4E
Q503	4E
Q504	3C
Q505	3C
Q506	3C
Q507	3C
Q508	3C
Q701	4A
Q702	4B
Q703	4B
Q704	4B
Q705	4B
Q7A1	5C
Q7A2	5B

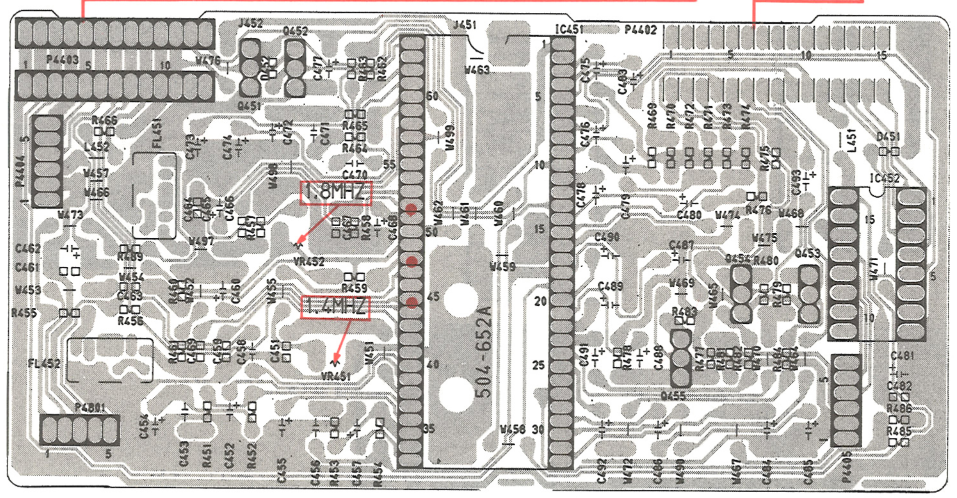
*** IC Voltage Sheet**


IC 202 (BA728
1
5
2.31 (2.31)
2.30 (2.30)
2.30 (2.30)
0.01 (0.01)
0.01 (0.01)
0.01 (0.01)
PAL mode
2.38 (2.41)
0.63 (0.63)
3.63 (3.21)
3.37 (3.37)
1.44 (1.40)
3.21 (3.21)
2.45 : PB
(2.44):(REC)
MESECAM mode
1
5
2.32 (0)
2.79 (2.42)
2.48 (2.75)
4.44 (2.68)
4.43 (2.68)
4.50 (4.49)
PAL mode
5.1 (5.09)
5.1 (5.09)
0 (0)
0 (0)
0 (0)
3.65 (3.76)
15
IC 303 (BA702
1
5
3.7 (3.68)
0 (0)
0 (0)
3.7 (3.68)
4.56 (4.55)
0 (0)
4.51
0
0
11.8
3.25
0
15
IC701(U443
1
5
4.51
0
0
3.23
5.5
1.76
4.37
0
0
0
5.27
12
15
IC702(TDA44
1
5
4.37
0.11
2.82
0.11
0.10
0.
4.4 (4.4)
4.4 (4.4)
4.4 (4.4)
0.3 (0.3)
4.5 (4.47)
5 (5)
4.9 (4.6
64
60
1
5
1.75 (1.75)
4.5 (4.43)
4.5 (4.44)
4.5 (4.45)
0 (0)
4.4 (4.43)
4.5 (4.4

P4403	
D.GND	1
MUTE "H"	2
REC VR (L)	3
EXT "L"	4
MUTE-R "H"	5
MUTE-L "H"	6
S.W 25	7
AUD.ENV.	8
9VA	9
VV/EE	10
4.43MHz	11
MIX "H"	12
REC VR (R)	13

P4402	
TUNER IN(L)	1
LINE IN(L)	2
MIX OUT	3
TUNER IN(R)	4
A.GND	5
LINE AUD;(R)	6
LINE AUD;(L)	7
NOR,AUD/IN	8
LINE IN(R)	9
NOR,AUD/OUT	10
5VA	11
CLK	12
DATA	13
ENA	14
TUNER"H"	15

2. Hi-Fi P.C.Board


IC451
P4402
P4403
1.8MHZ
1.4MHZ
504-652A

P4D02	
1	GND
2	FULL/ERASE

P3P09	
1	6VA (A)
2	5V
3	33V
4	12VA
5	6VA (D)
6	GND
7	GND

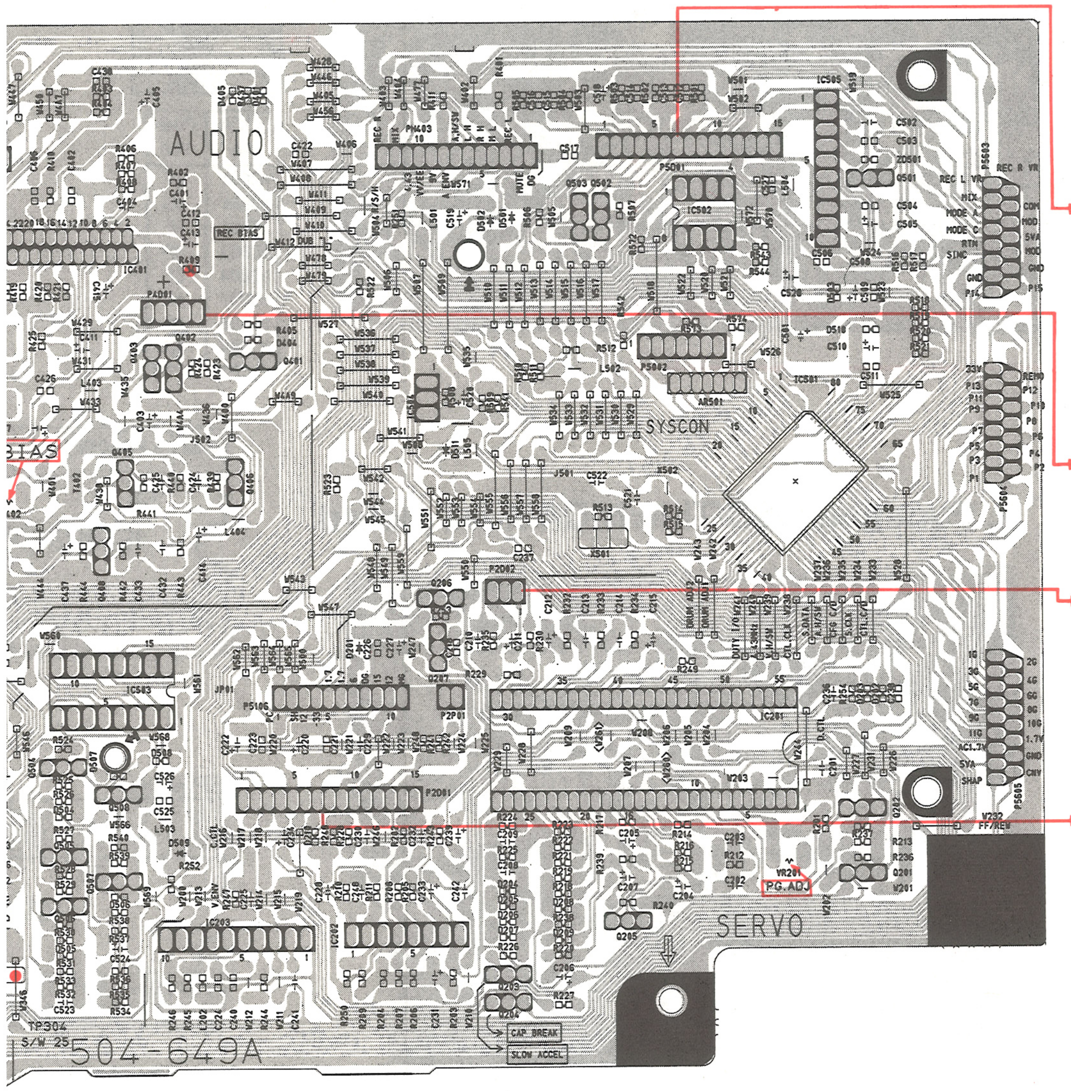
LOCA No	Posi-tion
IC451	1F
IC452	1G
Q451	2F
Q452	2F
Q453	1G
Q454	1G
Q455	1G

ABBREVIATIONS

ADJ. (Adjustment)
AGC. (Automatic Gain Control)
CAR. (Carrier)
DEV. (Deviation)
EE. (Electronic to Electronic)
PB. (Playback)
PG. (Pulse Generator)
REC. BIAS (Record Bias)
SIF (Sound Intermediate Frequency)
VIF. (Video Intermediate Frequency)

NOTE) ⚠ : Safety Parts
● : Measurement Point
☐ : Adjustment Point
Emitter : TRANSISTOR
Collector
Base

A B C D E F G



	P5D01
1	Vcc (5.3VA)
2	T-UP.SENSOR
3	SUPP.SENSOR
4	GND
5	CST SW
6	SUPPLY REEL
7	T-UP REEL
8	MODE COMMON
9	MODE SW A
10	MODE SW B
11	MODE SW C
12	Vcc (5.3VA)
13	DEW SENSOR
14	LOADING(-)
15	LOADING(+)

	P4D01
1	PB HEAD
2	GND
3	REC HEAD
4	GND
5	AUDIO/ERASE

	P2D02
1	CTL (-)
2	CTL (+)
3	GND

	P2D01
1	NC
2	C.FG (-)
3	5VA
4	C.FG (+)
5	12/15V
6	GND
7	C.CTL
8	F/R
9	C.M.GND
10	D.CTL
11	12V
12	D.M.GND
13	D.FG (+)
14	D.FG (-)
15	D.PG (+)

LOCA No	Position
IC201	3E
IC202	3D
IC203	3D
IC301	2B
IC302	1A
IC303	2A
IC304	3B
IC305	3B
IC401	4C
IC402	4C
IC501	4E
IC502	4E
IC503	3C
IC504	4D
IC505	5E
IC701	4B
IC702	4B
Q201	3E
Q202	3E
Q203	2E
Q204	2E
Q205	3E
Q301	2C
Q302	2A
Q303	2A
Q304	2C
Q305	1B
Q306	2B
Q307	2A
Q308	1B
Q309	1C
Q310	1C

LOCA No	Position
Q311	1B
Q312	1B
Q313	1B
Q314	1B
Q315	1B
Q316	1A
Q317	3A
Q318	3A
Q321	2C
Q401	4D
Q402	4D
Q403	4D
Q405	4C
Q406	4D
Q407	4C
Q408	4C
Q501	5E
Q502	4E
Q503	4E
Q504	3C
Q505	3C
Q506	3C
Q507	3C
Q508	3C
Q701	4A
Q702	4B
Q703	4B
Q704	4B
Q705	4B
Q7A1	5C
Q7A2	5B

P4403	
D.GND	1
MUTE "H"	2
REC VR (L)	3
EXT "L"	4
MUTE-R "H"	5
MUTE-L "H"	6
S.W 25	7
AUD.ENV.	8
9VA	9
VV/EE	10
4.43MHz	11
MIX "H"	12
REC VR (R)	13

P4402	
TUNER IN(L)	1
LINE IN(L)	2
MIX OUT	3
TUNER IN(R)	4
A.GND	5
LINE AUD;(R)	6
LINE AUD;(L)	7
NOR,AUD/IN	8
LINE IN(R)	9
NOR,AUD/OUT	10
5VA	11
CLK	12
DATA	13
ENA	14
TUNER "H"	15

	P4D02
1	GND
2	FULL/ERASE

	P3P09
1	6VA (A)
2	5V
3	33V
4	12VA
5	6VA (D)
6	GND
7	GND

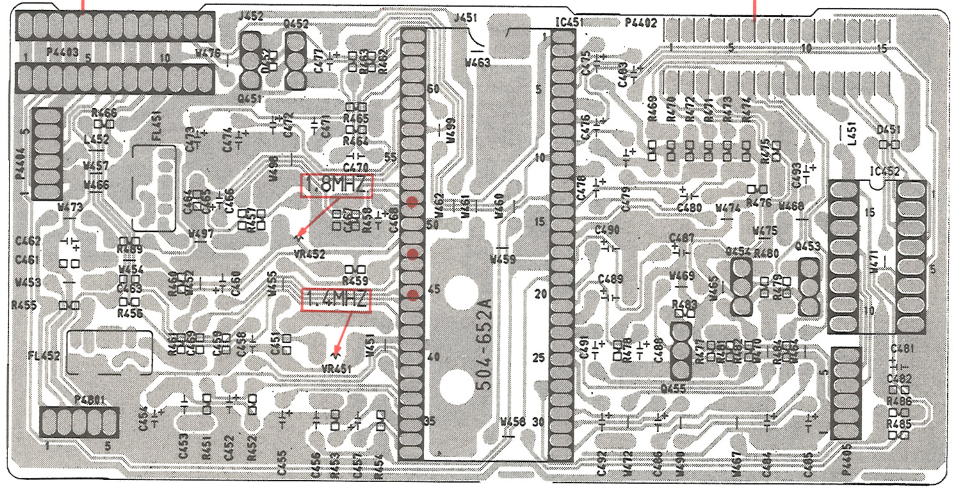
LOCA No	Position
IC451	1F
IC452	1G
Q451	2F
Q452	2F
Q453	1G
Q454	1G
Q455	1G

ABBREVIATIONS

ADJ.	(Adjustment)
AGC.	(Automatic Gain Control)
CAR.	(Carrier)
DEV.	(Deviation)
EE.	(Electronic to Electronic)
PB.	(Playback)
PG.	(Pulse Generator)
REC. BIAS	(Record Bias)
SIF	(Sound Intermediate Frequency)
VIF.	(Video Intermediate Frequency)

NOTE)
⚠ : Safety Parts
● : Measurement Point
☐ : Adjustment Point
Emitter : TRANSISTOR
Collector
Base

2. Hi-Fi P.C.Board



D E F G

* IC Voltage Sheet

PB(REC)

IC 202 (BA728N)

1 5

2.31	2.30	2.30	0.01	0.01	0.01	0.11	5.10
(2.31)	(2.30)	(2.30)	(0.01)	(0.01)	(0.01)	(0.11)	(5.10)

PB(REC)

IC 203 (BA7048N)

1 5 10

5.10	1.68	5.04	0.01	2.53	2.67	1.09	2.32	0	0
(5.09)	(1.68)	(5.04)	(0.02)	(2.54)	(2.54)	(0.21)	(0.17)	(0)	(0)

PB(REC)

8.51	2.60	2.12	2.05
(0)	(0)	(0)	(0.2)

IC 302 (MSM7403)

5
1

5.01	0	5.01	3.42
(0)	(0)	(0)	(0)

PAL mode PB(REC)

2.38	0.63	3.63	3.37	1.44	3.21	0.57	4.96	2.05	0	0.53	4.19	4.96	1.96	1.98	2.69	3.20	3.19
(2.41)	(0.63)	(3.21)	(3.37)	(1.40)	(3.21)	(0)	(4.99)	(2.02)	(0)	(0.51)	(4.19)	(4.95)	(1.96)	(1.99)	(2.54)	(3.20)	(3.19)

2.45 : PB
(2.44):(REC)
MESECAM mode

30 25 20

PB : 3.94
(REC): (3.93)
MESECAM mode

IC 301 (LA7390)

1 5 10 15

2.32	2.79	2.48	4.44	4.43	4.50	2.39	3.16	2.13	0	2.05	2.51	1.73	2.96	2.27	2.18	3.65	2.55
(0)	(2.42)	(2.75)	(2.68)	(2.68)	(4.49)	(2.29)	(2.25)	(2.13)	(0)	(2.09)	(2.53)	(1.69)	(2.97)	(2.55)	(2.19)	(3.66)	(3.26)

PB(REC)

IC 304 (LA7016)

1 8

11.7	7.64	0	6.96	0	0	7.6	0
(11.6)	(7.58)	(0)	(6.9)	(0)	(0)	(7.54)	(0)

PAL mode PB(REC)

5.1	5.1	0	0	0	3.65	0	3.65	0
(5.09)	(5.09)	(0)	(0)	(0)	(3.76)	(0)	(3.76)	(0)

15 10

IC 303 (BA7025L)

1 5

3.7	0	0	3.7	4.56	0	4.54	0	3.1
(3.68)	(0)	(0)	(3.68)	(4.55)	(0)	(4.51)	(0)	(3.1)

MESECAM mode PB(REC)

5.1	5.1	4.44	0	4.26	3.58	4.33	3.57	0
(5.09)	(5.09)	(4.43)	(0)	(4.26)	(3.59)	(4.32)	(3.57)	(0)

15 10

IC 303 (BA7025L)

1 5

3.7	0	0	3.7	4.55	0	4.56	0	3.1
(3.69)	(0)	(0)	(3.69)	(4.54)	(0)	(4.54)	(0)	(3.1)

EE mode

4.87	0	0	5.06	0.34	0.35	0

10

IC305(MB84066B)

1 5

5.06	0.35	0.35	0	0	0	0

4.51	0	0	11.8	3.25	0	0.73	8.46	5.0

15 10

IC701(U4439BG)

1 5

4.51	0	0	3.23	5.5	1.76	0	8.46	5.0

PB(REC)

3.5	0	3.6	3.6	3.6	4.2	0	4.2	4.2	0	4.2	1.1
(3.5)	(0)	(3.6)	(3.6)	(3.6)	(4.1)	(0.6)	(4.1)	(4.1)	(0)	(4.2)	(8.6)

10 20 24

IC 401 (BA7790LS)

1 5 15

0	0	9	9.2	0	5	3.8	4.2	0.6	4.2	4.2	0.1
(0)	(0.2)	(9)	(9.1)	(0)	(0)	(3.8)	(4.2)	(0.6)	(4.2)	(4.2)	(0)

4.37	0	0	0	5.27	12.1	0	4.77

15 10

IC702(TDA4445A)

1 5

4.37	0.11	2.82	0.11	0.10	0.10	0.10	4.77

PB(REC)

IC 402 (BA728N)

1 5

5.6	2.6	2.5	0	2.5	2.5	5.4	12
(5.6)	(2.6)	(2.5)	(0)	(2.5)	(2.5)	(5.4)	(12)

PB(REC)

4.9	4.9	4.9	0	0	4.9	2.0	2.0
(4.9)	(4.9)	(4.9)	(0)	(0)	(4.9)	(2.0)	(2.0)

15 10

IC 452 (TC4094BP)

1 5

0	0.2	0	4.8	0	4.9	4.9	0
(0)	(0.2)	(0)	(4.8)	(0)	(4.9)	(4.9)	(0)

PB(REC)

4.4	4.4	4.4	0.3	4.5	5	4.9	0.5	0	0	3.8	1.7	3.7	2.0	3.0	9	5.5	1.2	2.5	3.7	3.0	3.8	4.3	0	3.7	4.8	4.3	4.4	0.4	4.4	4.4	4.4
(4.4)	(4.4)	(4.4)	(0.3)	(4.47)	(5)	(4.6)	(0)	(0)	(0)	(3.8)	(1.7)	(3.9)	(2)	(3.1)	(9)	(5.3)	(1.3)	(2.6)	(3.9)	(0)	(3.8)	(0.7)	(0)	(3.9)	(4.6)	(4.3)	(4.4)	(0.4)	(4.4)	(4.4)	(4.4)

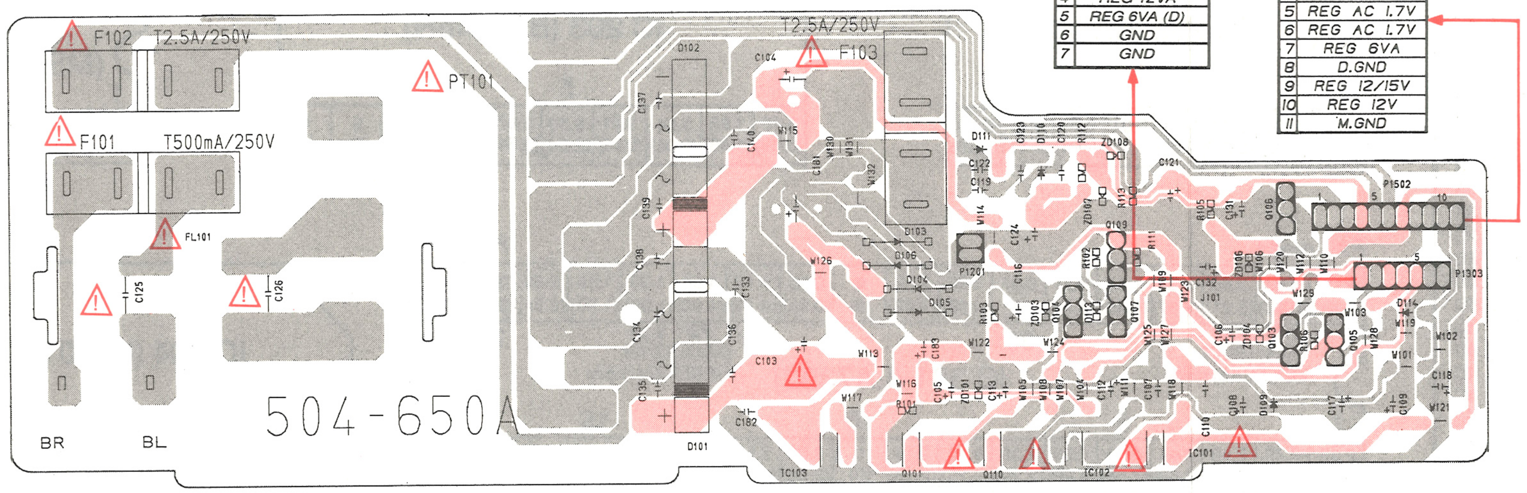
64 60 55 50 45 40 35

IC 451 (TA8813AN)

1 5 10 15 20 25 30

1.75	4.5	4.5	4.5	0	4.4	4.5	4.4	4.4	0	4.4	4.4	4.9	4.4	4.9	0	0.2	4.4	0.6	4.4	4.5	7.5	4.5	0	4.5	4.4	2.5	4.5	4.4	4.5	4.4	1.78
(1.75)	(4.43)	(4.44)	(4.45)	(0)	(4.43)	(4.47)	(4.43)	(4.40)	(0)	(4.40)	(4.43)	(4.9)	(4.43)	(4.9)	(0)	(0.5)	(4.4)	(0.6)	(4.4)	(4.4)	(7.5)	(4.5)	(0)	(4.5)	(4.4)	(2.5)	(4.5)	(4.4)	(4.6)	(4.4)	(1.78)

3. Power P.C.Board

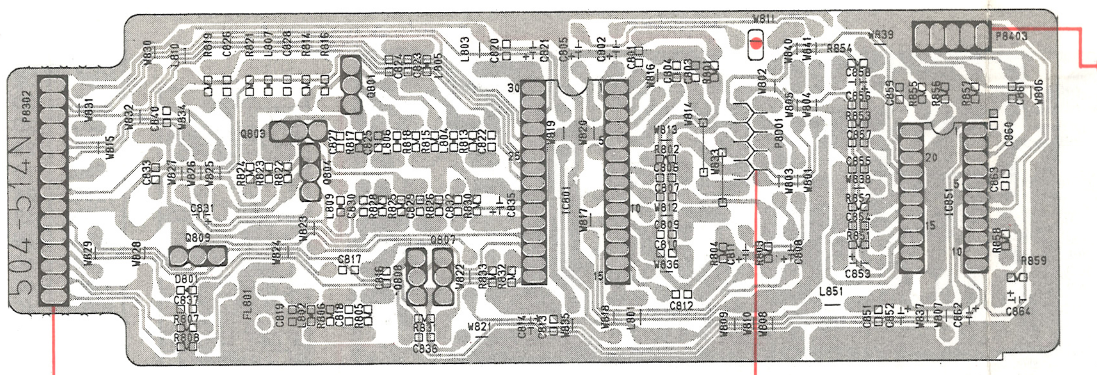

F102 T2.5A/250V
F101 T500mA/250V
T2.5A/250V F103
PT101
FL101
BR
BL
504-650A
P1502
P1303

P1303	
1	REG 6VA (A)
2	REG 5V
3	REG 33V
4	REG 12VA
5	REG 6VA (D)
6	GND
7	GND

P1502	
1	P/C
2	SPE"H"
3	NC
4	REG -27VA
5	REG AC 1.7V
6	REG AC 1.7V
7	REG 6VA
8	D.GND
9	REG 12/15V
10	REG 12V
11	M.GND

LOCA No	Position
IC101	4D
IC102	4D
IC103	4C
Q101	4C
Q103	4D
Q104	4D
Q105	4D
Q106	4D
Q107	4D
Q109	4D
Q110	4C

4. Pre-Amp P.C.Board


504-514N
P8302
P8403
P8001

P8403	
1	PB FM
2	REC FM
3	GND
4	GND
5	S/W 25

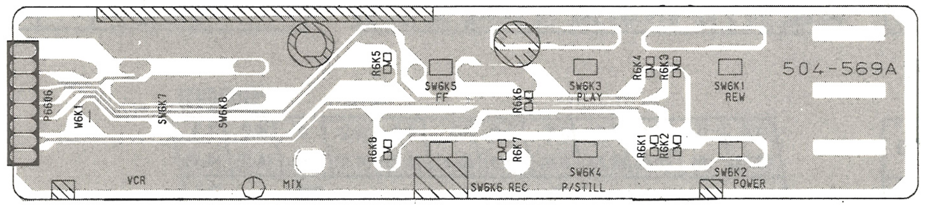
LOCA No	Position
IC801	4F
IC851	4G
IC801	5F
IC803	5F
IC804	5F
IC807	4F
IC808	4F
IC809	4E

P8302	
1	D/A
2	C.SYNC
3	S/W 25
4	ROTARY SW
5	SP 'L'
6	ATR FM
7	5V
8	PB COLOR
9	GND
10	REC.START'H'
11	SLOW 'L'
12	PB FM
13	GND
14	REC COLOR
15	REC Y

P8D01	
AUDIO B PB	1
AUDIO REC	2
AUDIO A PB	3
LP B REC	4
LP B PB	5
LP A REC	6
LP A PB	7
SP A REC	8
SP A PB	9
SP B REC	10
SP B PB	11

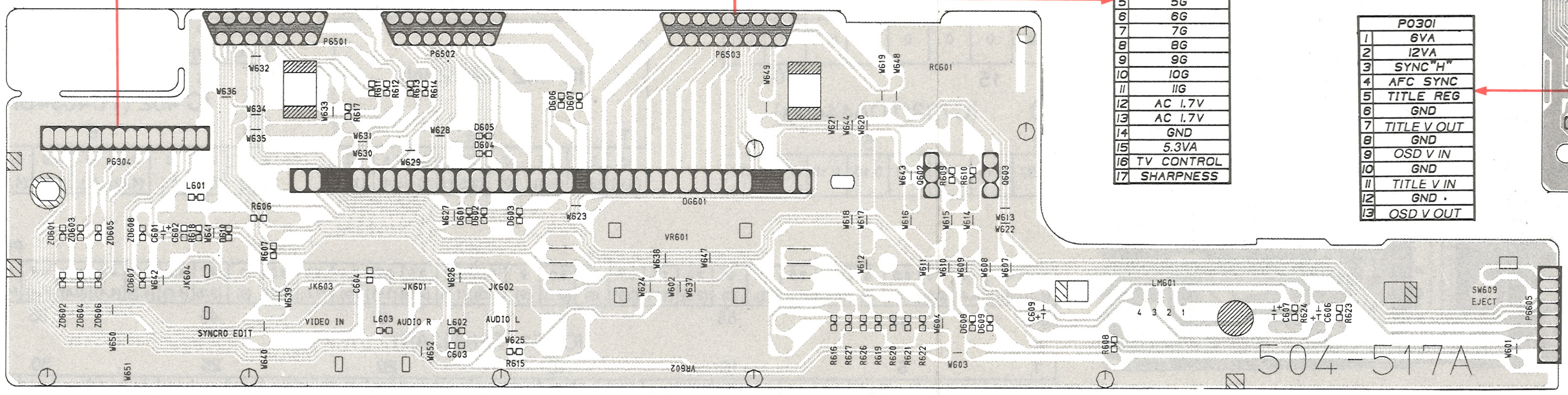
LOCA No	Position
IC001	2H
IC002	2G
IC003	2G
IC703	3G
IC704	3H
Q001	2G
Q002	2H
Q003	2H
Q005	2H
Q006	2H
Q007	2H
Q008	2H
Q009	2H
Q010	2G
Q011	2G
Q012	2G
Q060	2G
Q062	2G

5. Key Function P.C.Board


504-569A
SW6K5 FF
SW6K3 PLAY
SW6K1 REW
VCR
MIX
SW6K6 REC
SW6K4 P/STILL
SW6K2 POWER

NOTE) P.C. Boards are all solder side.

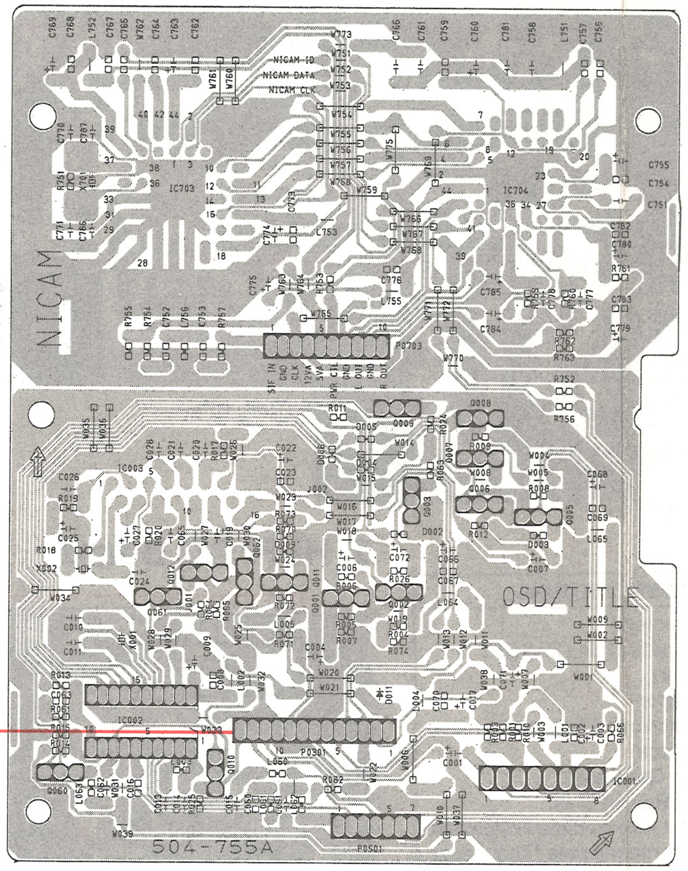
6. Timer P.C.Board


P6501
P6502
P6503
P6304
DG601
VR601
JK601
JK602
JK603
VIDEO IN
AUDIO R
AUDIO L
SYNCRO EDIT
SW609 EJECT
504-517A

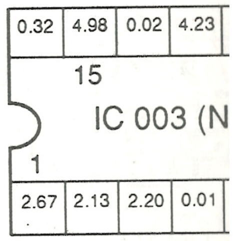
P6304	
A.OUT(L) L/M	1
AUDIO M-F(L)	2
GND	3
AUDIO M-F(R)	4
A.OUT(R) L/M	5
GND	6
VIDEO M-F	7
GND	8
VIDEO F-M	9
GND	10
GND	11
AUDIO (R) F-M	12
GND	13
AUDIO (L) F-M	14

P6503	
1	1G
2	2G
3	3G
4	4G
5	5G
6	6G
7	7G
8	8G
9	9G
10	10G
11	11G
12	AC 1.7V
13	AC 1.7V
14	GND
15	5.3VA
16	TV CONTROL
17	SHARPNESS

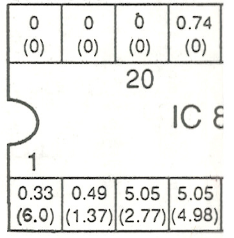
7. Function OSD/Title/NICAM P.C.Board

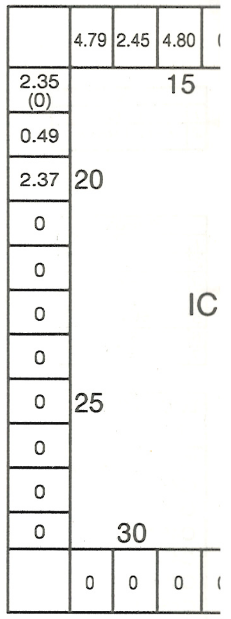

NICAM
NICAM-SD
NICAM-DATA
NICAM-CLK
OSD/TITLE
504-755A
P0501

P0301	
1	6VA
2	12VA
3	SYNC"H"
4	AFC SYNC
5	TITLE REG
6	GND
7	TITLE V OUT
8	GND
9	OSD V IN
10	GND
11	TITLE V IN
12	GND
13	OSD V OUT


0.32
4.98
0.02
4.23
15
IC 003 (N
1
2.67
2.13
2.20
0.01

SP mode


0
(0)
0
(0)
0
(0)
0.74
(0)
20
IC 8
1
0.33
(6.0)
0.49
(1.37)
5.05
(2.77)
5.05
(4.98)


4.79
2.45
4.80
2.35
(0)
15
0.49
2.37
20
0
0
0
0
0
25
0
0
0
30
IC
0
0
0

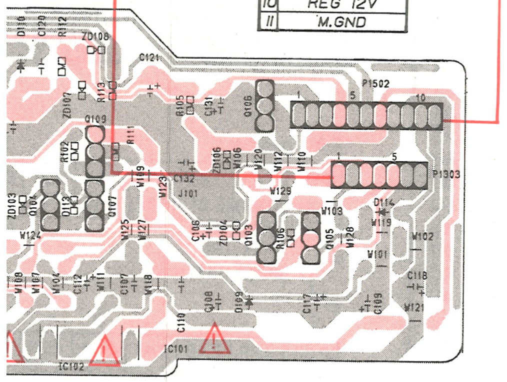
NOTE)
- ⚠ : Safety Parts
- ● : Measurement Point
- ☐ : Adjustment Point
- Emitter : TRANSISTOR
- Collector
- Base
- ■ : Alive Voltage

A B C D E F G H

5 4 3 2 1

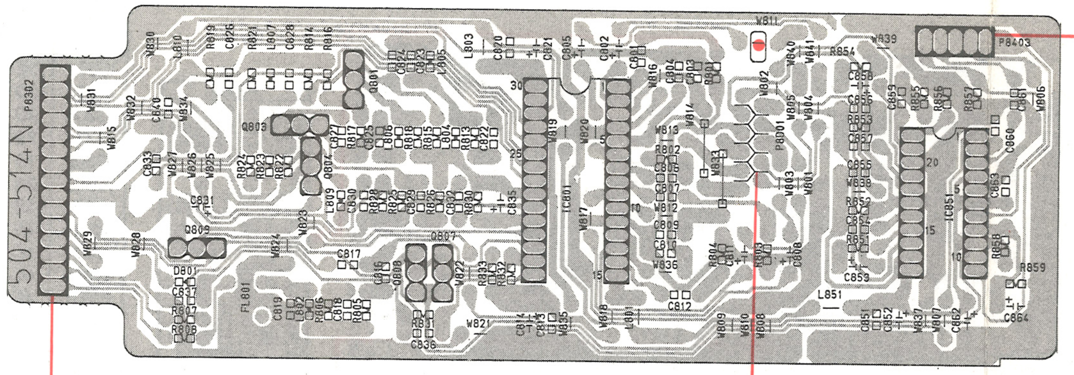
P1303	
1	REG 6VA (A)
2	REG 5V
3	REG 33V
4	REG 12VA
5	REG 6VA (D)
6	GND
7	GND

P1502	
1	P/C
2	SPE"H"
3	NC
4	REG -27VA
5	REG AC 1.7V
6	REG AC 1.7V
7	REG 6VA
8	D.GND
9	REG 12/15V
10	REG 12V
11	M.GND



LOCA No	Position
IC101	4D
IC102	4D
IC103	4C
Q101	4C
Q103	4D
Q104	4D
Q105	4D
Q106	4D
Q107	4D
Q109	4D
Q110	4C

4. Pre-Amp P.C.Board



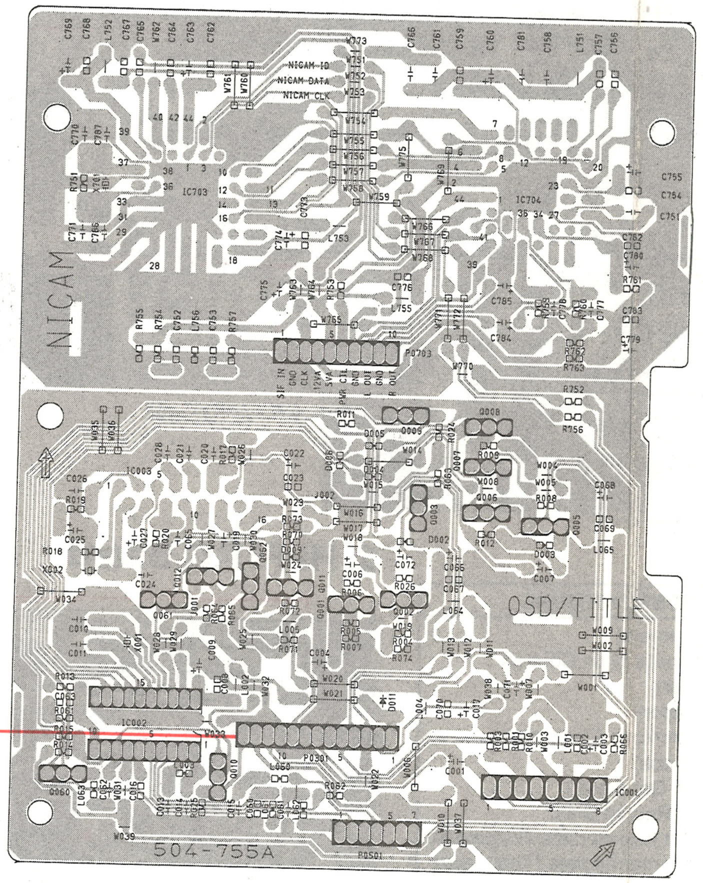
P8403	
1	PB FM
2	REC FM
3	GND
4	GND
5	S/W 25

LOCA No	Position
IC801	4F
IC851	4G
IC801	5F
IC803	5F
IC804	5F
IC807	4F
IC808	4F
IC809	4E

P8302	
1	D/A
2	C.SYNC
3	S/W 25
4	ROTARY SW
5	SP 'L'
6	ATR FM
7	5V
8	PB COLOR
9	GND
10	REC.START'H'
11	SLOW 'L'
12	PB FM
13	GND
14	REC COLOR
15	REC Y

P8D01	
AUDIO B PB	1
AUDIO REC	2
AUDIO A PB	3
LP B REC	4
LP B PB	5
LP A REC	6
LP A PB	7
SP A REC	8
SP A PB	9
SP B REC	10
SP B PB	11

7. Function OSD/Title/NICAM P.C.Board



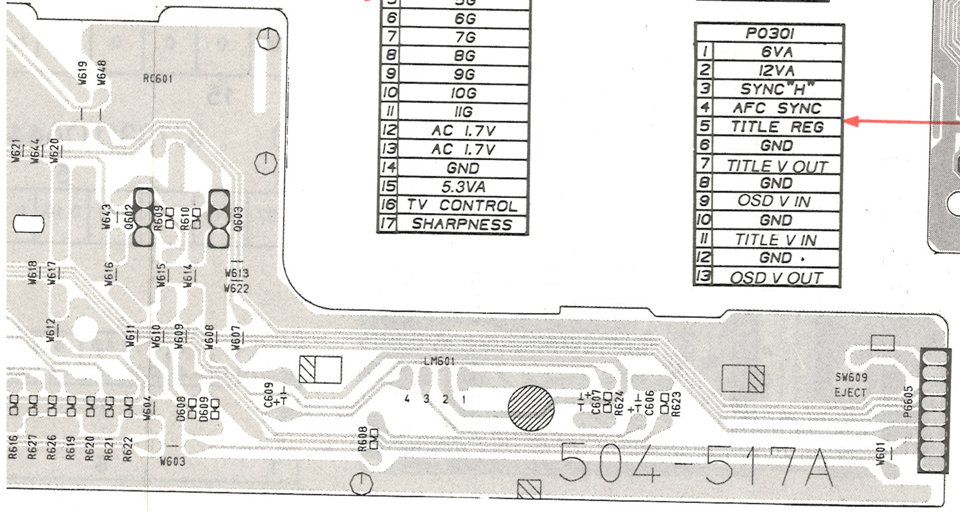
LOCA No	Position
IC001	2H
IC002	2G
IC003	2G
IC703	3G
IC704	3H
Q001	2G
Q002	2H
Q003	2H
Q005	2H
Q006	2H
Q007	2H
Q008	2H
Q009	2H
Q010	2G
Q011	2G
Q012	2G
Q060	2G
Q062	2G

P0301	
1	6VA
2	12VA
3	SYNC"H"
4	AFC SYNC
5	TITLE REG
6	GND
7	TITLE V OUT
8	GND
9	OSD V IN
10	GND
11	TITLE V IN
12	GND
13	OSD V OUT

er side.

P6304	
A.OUT(L) L/M	1
AUDIO M-F(L)	2
GND	3
AUDIO M-F(R)	4
A.OUT(R) L/M	5
GND	6
VIDEO M-F	7
GND	8
VIDEO F-M	9
GND	10
GND	11
AUDIO (R) F-M	12
GND	13
AUDIO (L) F-M	14

P6503	
1	1G
2	2G
3	3G
4	4G
5	5G
6	6G
7	7G
8	8G
9	9G
10	10G
11	11G
12	AC 1.7V
13	AC 1.7V
14	GND
15	5.3VA
16	TV CONTROL
17	SHARPNESS



NOTE)
⚠ : Safety Parts
● : Measurement Point
□ : Adjustment Point
Emitter : TRANSISTOR
Collector
Base
■ : Alive Voltage

* IC Voltage Sheet

IC 001(NJM2249L)

5

5.08	0.05	5.36	0.05	5.29	11.71	4.35	0

5.11	4.89	4.56	2.36	2.36	0.01	0.01	0.01	0.01	0

20 15

IC 002 (M35010)

1 5 10

2.43	2.42	5.01	5.01	5.01	5.09	5.01	2.43	3.64	2.38

0.32	4.98	0.02	4.23	1.86	0.58	0.09	0.20

15 10

IC 003 (NJM2229)

1 5

2.67	2.13	2.20	0.01	0.72	3.13	2.44	0

LP mode PB(REC)

5.05 (5.03)	2.00 (3.84)	4.73 (4.78)	0.25 (0.25)	1.26 (1.26)	2.22 (2.22)	4.91 (4.9)	3.05 (4.35)	0 (0)	2.84 (3.14)	2.21 (0.09)	2.52 (0)	4.09 (4.05)	0 (2.23)	2.68 (2.74)

30 25 20

IC 801 (HA118019)

1 5 10 15

4.22 (4.26)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	4.21 (4.26)	2.28 (4.26)	0 (2.11)	0.68 (2.10)	0 (0)	0.68 (2.11)	0 (2.13)	2.27 (4.17)	5.02 (4.84)

SP mode PB(REC)

5.05 (5.03)	1.99 (3.82)	4.72 (4.78)	0.25 (0.25)	1.26 (1.26)	2.20 (2.21)	0.11 (0.1)	0 (4.35)	0 (0)	2.84 (3.14)	2.24 (0.09)	2.48 (0.03)	4.10 (4.05)	0 (2.23)	2.67 (2.74)

30 25 20

IC 801 (HA118019)

1 5 10 15

2.33 (4.25)	0 (2.19)	0.68 (2.16)	0 (0)	0.68 (2.18)	0 (2.2)	2.27 (4.25)	4.23 (4.26)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	4.23 (4.26)	5.01 (4.84)

SP mode PB(REC)

0 (0)	0 (0)	0 (0)	0.74 (0)	0.65 (0)	0 (0)	0.65 (0)	0.74 (0)	0 (4.27)	0 (4.27)	5.05 (4.98)

20 15

IC 851 (BA7740S)

1 5 10

0.33 (6.0)	0.49 (1.37)	5.05 (2.77)	5.05 (4.98)	0.02 (0)	5.06 (4.98)	2.39 (3.60)	3.02 (2.97)	5.06 (4.98)	0 (0.02)	2.53 (0.01)

LP mode PB(REC)

0 (0)	0 (0)	0 (0)	0.74 (0)	0.65 (0)	0 (0)	0.65 (0)	0.74 (0)	0 (4.27)	4.67 (4.27)	5.05 (4.98)

20 15

IC 851 (BA7740S)

1 5 10

0.33 (6.0)	0.50 (1.37)	2.82 (2.77)	5.05 (4.98)	0 (0)	5.05 (4.98)	2.70 (3.60)	5.05 (2.97)	5.05 (4.98)	5.11 (0.02)	2.53 (0.01)

G-2 (NICAM)

IC 703 (MSP2410)

4.79	2.45	4.80	0	0.92	0.85	1.21	5.18	0	0	0

15 10 5 1 20 25 30 35 40

2.35 (0)		0
0.49		0
2.37		0
0		3.07
0		2.20
0		5.10
0		2.67
0		0.75
0		1.54
0		1.54
0		0

0	0	0	0	0	0	0.91	2.39	2.42	0	4.91

G-2 (NICAM)

IC 704 (ACP2371VS)

2.21	2.21	2.21	2.21	2.21	4.65	2.39	2.39	0.06	1.21	2.45

15 10 5 1 20 25 30 35 40

2.21		5.18
2.21		0.92
4.65		0.85
0		0
0		0
2.19		4.66
2.28		4.66
2.28		0
2.22		3.07
2.22		5.10
2.22		0

2.22	2.23	2.23	3.19	3.19	1.21 (2.10)	10.77 (7.85)	10.81 (7.97)	0	0	2.20

D E F G H

Ersatzteilbestellung:	
Btx:	*50705990#
Fax:	0 92 61/9 94 13
Telefon:	0 92 61/9 94 22

Reparaturhilfen:	
Btx:	*507058140#
Btx-Hotline:	*50705819#
Telefon-Hotline:	0 92 61/99 700

Hinweis! Ersatzteibestellung nur über die Kundendienst-Zentrale 8640 Kronach

LOEWE.-Vertragswerkstätten

2000	Michael Hinz Audio-Video-TV-Service Billstraße 33 Hamburg 26 Tel: 0 40/7 89 89 89 Fax: 0 40/7 89 84 19. Telex 214561	**4600**	HVS Lösbar GmbH Planetenfeldstr. 24-30 Dortmund 1 Tel: 02 31/17 80 00 u. 17 00 00 Fax: 02 31/17 90 90	**7257**	Pavlek Video & Fernseh-Service Max-Eyth-Service Ditzingen-Hirschlanden Tel: 0 71 56/3 94 67 od. 3 98 89 Fax: 0 71 56/36 80
2090	Video Electronic Service Inh. Gerhard Will Ilmer Moorweg 32 Winsen/Luhe Tel: 0 41 71/7 20 74 Fax: 0 41 71/78 38	**5000**	EWS Elektronik-Service Dipl.-Ing. Fred Wenzel Auf der Juchen 2 Köln 80 Tel: 02 21/6 80 15 85 Fax: 02 21/6 80 15 88	**8000**	Fernseh-Service W. Appel - J. Drössler Lerchenstraße 8 München 50 Tel: 0 89/3 51 74 62 od. 67 Btx: 0 89/3 51 74 67
3000	DW-Service GmbH Haltenhoffstraße 52 54 Hannover 1 Tel: 05 11/71 40 73 Fax: 05 11/7 00 09 97	**5400**	Hans Krempl Haustechnik GmbH Koblenz Tel: 02 61/89 09-0 Btx: 02 61/8 30 74 Fax: 02 61/8 30 74	**8500**	Norbert Nickl Kupernikusstraße 21/23 Nürnberg 40 Tel: 09 11/4 46 64 60 Btx: 09 11/4 46 64 60
3501	Häusler GmbH Oderweg 6 Fuldabrück-Berghausen Tel: 05 61/58 20 77 Fax: 05 61/58 36 52	**6200**	VAD Video- und Audio-Dienst Ostring 7 Wiesbaden-Nordenstadt Tel: 0 61 22/1 20 54-55 Fax: 0 61 22/1 56 03		

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3501	Häusler GmbH Oderweg 6 Fuldabrück-Berghausen Tel: 05 61/58 20 77 Fax: 05 61/58 36 52	**8500**	Fa. Walter Gehrmann Kupernikusstraße 21/23 Nürnberg 40 Tel: 09 11/4 56 45 Btx: 09 11/4 56 45		

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2000	LOEWE OPTA Nagelsweg 47 Hamburg 1 Tel: 0 40/23 61 07 27 Btx: 0 40/2 36 10 70 01	**6070**	LOEWE OPTA Robert-Bosch-Str. 5 Langen Tel: 0 61 03/75 01 18 Btx: 0 61 03/75 01	**8000**	LOEWE OPTA Lerchenstraße 8 München 50 Tel: 0 89/35 48 08 23 Btx: 0 89/35 48 08
3000	LOEWE OPTA Mogelkenstr. 34 Hannover Tel: 05 11/3 52 30 03 Btx: 05 11/3 52 30 18	**6500**	LOEWE OPTA Parkstraße 10 Gera Tel: 09 70/2 43 12 Fax: 09 70/2 35 81	**8640**	LOEWE OPTA GmbH Kundendienst-Zentrale Kronach Tel: 0 92 61/9 94 03 Btx: 0 92 61/99#700

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Tel. 03-2358767
Tlx. 73465

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Kundendienst-Zentrale
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High Tech Industries S.A.
16-18 Rue des Oliviers, Senia 704
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Tel. 01-46 75 00 29
Tlx. 26 3 464
Fax 01-46 75 96 87

GRIECHENLAND
Radio Athinae A.E.V.E.T.E.
Kifissou & Petrou Ralli Str. Aegaleo
GR - 122 41 Athen
Tel. 01-5 61 53 73
Tlx. 215052
Fax 01-5 61 52 08

HOLLAND
AVAC Electronics B.V.
Postbus 131
NL - 4130 EC Vianen (Z-H)
Tel. 0 34 73-64 422
Tlx. 47 676
Fax 0 34 73-75 413

ITALIEN
Loewe Opta Italiana SRL.
Viale del Lavoro, 43
I - 37036 San Martino Buon Albergo (VR)
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JUGOSLAWIEN
Jadran Export Import P.O. Sežana
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C/. Carvajal No. 2
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Tlx. 96 024
Fax 0 28-24 86 39

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Flamingo Complex
Cannon Road
Quormi
Tel. 49 71 82/3
Fax 44 59 83

NORWEGEN
TV-Vakten A/S
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N - 1413 Tårnåsen
Tel. 02-80 16 41
Fax 02-80 83 09

ÖSTERREICH
Loewe Opta Ges. mbH
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Fax 07 32-66 94 91 77

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SGO Santos, Guimerães & Oliveira, S.A.
Estrada da Circunvala ção, 11124
Senhora da Hora
P - 4450 Matosinhos (Porto)
Tel. 02-9 51 50 03
Tlx. 28456
Fax 02-9 51 90 34

SCHWEDEN
ECE Service AB
Svetsarvägen 10
S - 171 27 SOLNA
Tel. 08-28 51 10
Fax 08-28 58 68

SCHWEIZ
Egli, Fischer & Co. AG
Gotthard-Str. 6, Claridenhof
CH - 8022 Zürich
Tel. 01-2 09 81 11
Telefax 01-201 2275

SPANIEN
Tecnolec S.A.
Pinar del rio, 48-50
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Tel. 03-3408753
Tlx. 99 268
Fax 03-3401200

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International Dynamics Pty. Ltd.
84-88 Bridge Road,
Richmond, 3121
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Tel. 03-4 29 19 44
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Fax 03-4 28 09 83

HONGKONG
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Room 517, Peninsula Centre
67 Mody Road
Tsim Sha Tsui East
Kow Loon/Hong Kong
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Assarain Enterprise L.L.C
P.O. Box 4475
RUWI, Sultanate of Oman
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SINGAPORE / MALAYSIA
WO KEE HONG (M) PTE Ltd.
24, Leng Kee Road
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TÜRKEI
Milteknik Elektromekanik Sanayi A
Kagithane Boston S. K. No. 10
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Tel. 01-1 46 54 33
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V.A.E
Super Traiding Establishment
P.O. Box 6409
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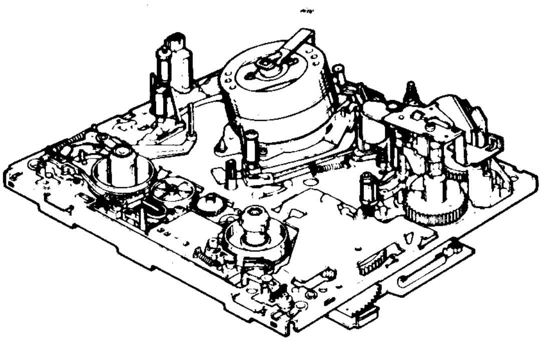
Pangratis Liveras & Son Ltd.
P.O. Box 1883
Archbishop Makarios III
Avenue 14C-14D
CY - Nicosia
Tel. 02-44 34 96
Tlx. 3 327
Fax 02-46 42 12

Änderungen vorbehalten
Con riserva di modifiche
Subject to modification

LOEWE.

Kundendienst-
Serviceanleitung



VHS

PAL

VHS
OC 1200 M
OC 1250 M
OC 1500 M
OC 1600 H
MECHANISM

Sicherheitsvorschriften
Bei Reparaturarbeiten an den Geräten sind die Sicherheitsbestimmungen gemäß VDE 0860 und Nachträgen zu beachten und einzuhalten.
Spezielle Bauteile in den Geräten dürfen aufgrund ihres Aufbaues nur durch Originalteile ersetzt werden. Außerdem sind die am Reparaturort gültigen Schutzbestimmungen der Bundesgenossenschaft beim Umgang mit diesen Geräten einzuhalten. Hierzu gehört auch die Beschaffenheit des Arbeitsplatzes.
Die Kenntnis dieser Vorschriften ist die Voraussetzung, um einen fachgemäßen Service der Geräte durchführen zu können.
Bei Betrieb dieser Geräte im Ausland sind die jeweiligen Schutzbestimmungen des Landes zu berücksichtigen und einzuhalten.

SAFETY PRECAUTIONS
The following precautions should be observed when servicing.
1. Since many parts in the unit have special safety-related characteristics, always use genuine LOEWE replacement parts. Especially critical parts in the power circuit block should not be replaced with other makes.
2. Before returning a repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that is completely safe to operate without danger of electrical shock.

Norme di sicurezza
Effettuando dei lavori di riparazione sugli apparecchi bisogna osservare e rispettare le disposizioni di sicurezza a norma VDE 0860 e appendici.
Componenti speciali negli apparecchi vanno sostituiti, causa la loro composizione, solo con ricambi originali. Vanno inoltre rispettate le disposizioni di sicurezza dell'ente di assicurazione contro gli infortuni sul lavoro in vigore nel luogo di riparazione. Ciò vale anche per le condizioni del posto di lavoro. La cognizione di tali norme costituisce la premessa per poter effettuare un'assistenza tecnica a regola d'arte.
Impiegando gli apparecchi all'estero occorre rispettare ed attenersi alle norme di sicurezza del rispettivo paese.

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MECHANISM

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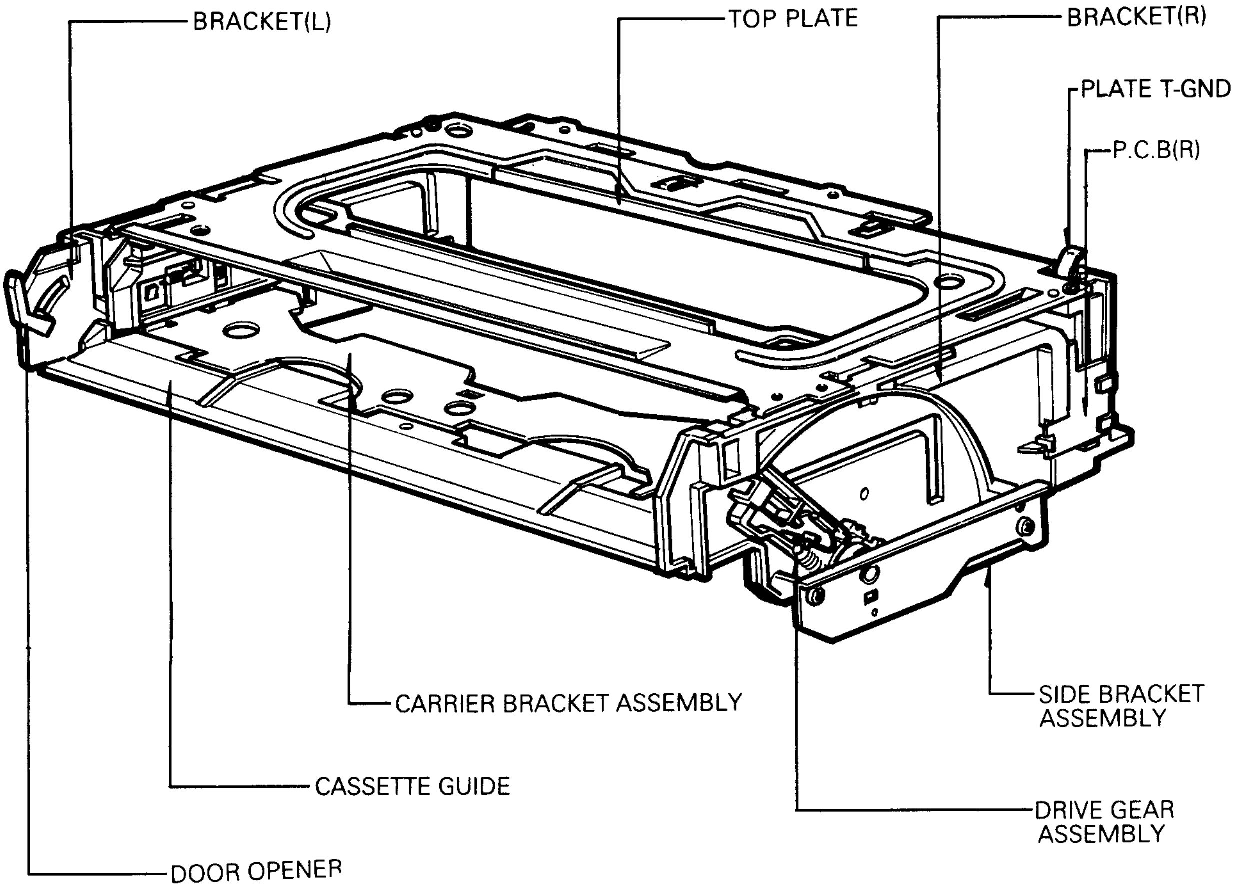
FRONT LOADING MECHANISM DISASSEMBLY

• Front Loading Mechanism Parts Location


BRACKET(L)
TOP PLATE
BRACKET(R)
PLATE T-GND
P.C.B(R)
CARRIER BRACKET ASSEMBLY
SIDE BRACKET ASSEMBLY
CASSETTE GUIDE
DRIVE GEAR ASSEMBLY
DOOR OPENER

Front Loading Mechanism Parts Location

1. Component list below will be discribed as if the top and bottom covers and the front panel have already been removed.
2. P.C.B Assembly
3. Top Plate
4. Carrier Bracket Assembly
5. Cassette Guide
6. Side Bracket Assembly
7. Bracket(L), (R)
8. Door Opener
9. Drive Gear Assembly

1. Front Loading Mechanism Assembly (Fig. A-1-1)

1) Remove the Top and Bottom Covers and the Front panel.
2) Unplug the connector.
3) Remove two screws(A).
4) Lift up the Front Loading Mechanism in the direction of arrow(C).

*** NOTE**

1) When disassembling and reassembling

① Give special attention to removal. because two tabs(D) are engaged.

② Make sure that Bosses of Bracket(L),(R) are properly engaged in the holes of the chassis.

③ To reassemble Front Loading Mechanism, the Drive Gear Assembly should be turned in a counterclockwise as shown in Fig. A-1-2 so that the Rack Gear N.D of Front Loading Mechanism Assembly is meshed into Rack Gear F.L of Deck Mechanism Assembly correctly as shown in Fig. A-1-1.(B).

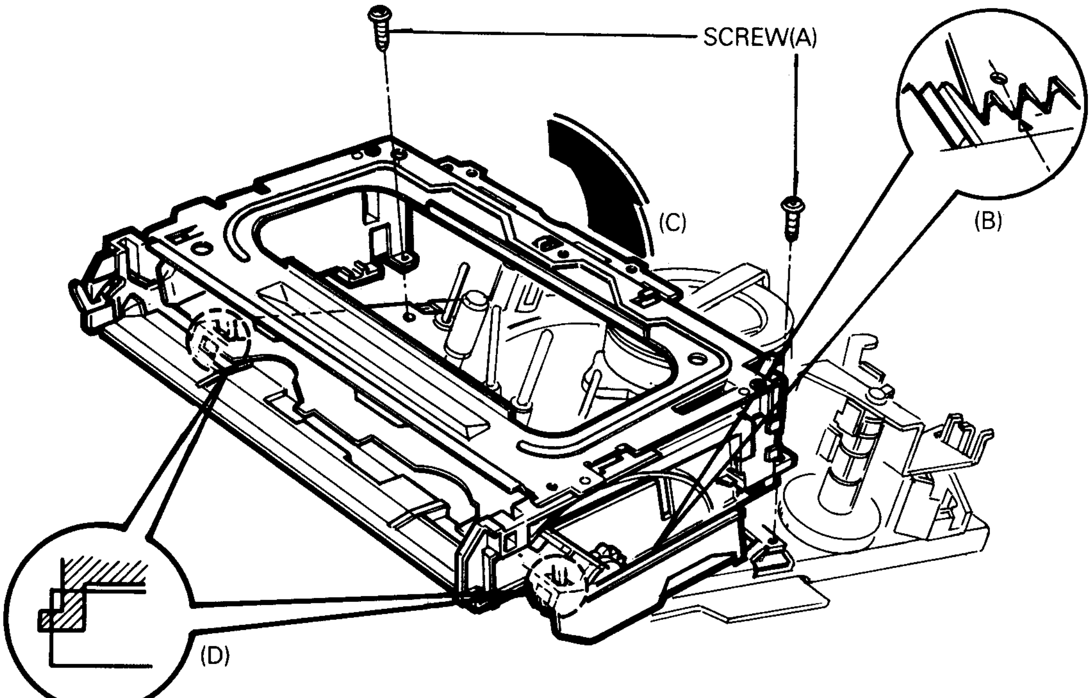
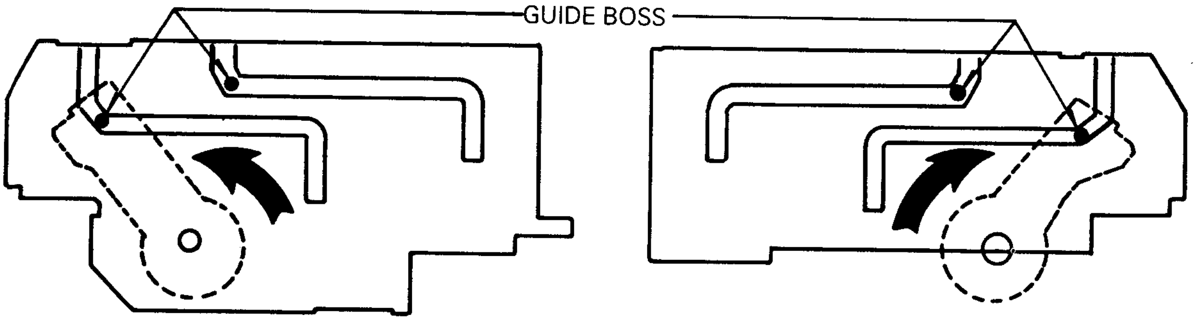


Fig. A-1-1 Front Loading Mechanism



a) Right Side Bracket

b) Left Side Bracket

Fig. A-1-2 Carrier Bracket Assembly

2. PCB(Printed Circuit Board) Assembly

2-1. P.C.B Assembly(R)(Fig. A-2)

1) Remove the PCB Assembly(R) by pushing three Hooks (A) outward.
2) Release the Lead wire from stoppers.

2-2. PCB Assembly(L).(Fig. A-2)

1) Remove the PCB Assembly(L) by pushing the Hook(B) outward.
2) Release the Lead Wire from stoppers.

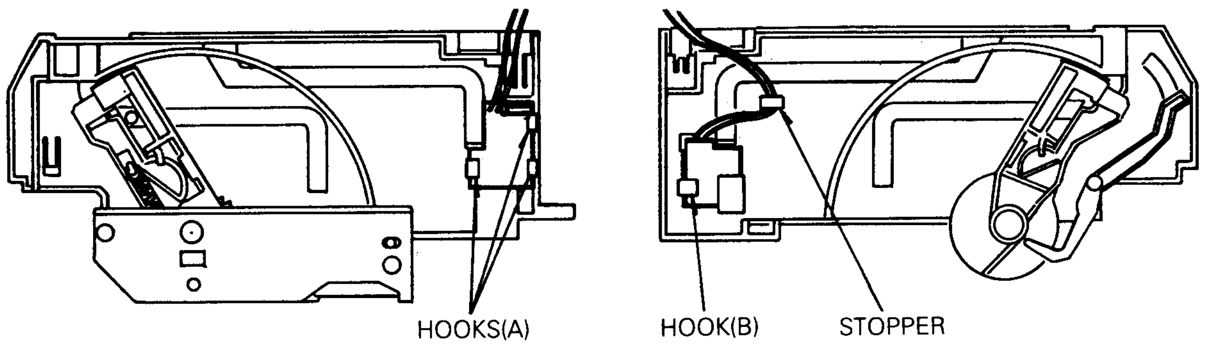


Fig. A-2 PCB Assembly

3. Top Plate(Fig. A-3)

1) Remove two screws(A).
2) Push the upper part of Top plate Ground and then lift up the Top Plate.

*** NOTE**

1) When reassembling, be certain that the tabs(C) of Top Plate is in both Bracket(L),(R).

① Then align the guide holes(D) of Top Plate with Bosses of side Bracket(L),(R).

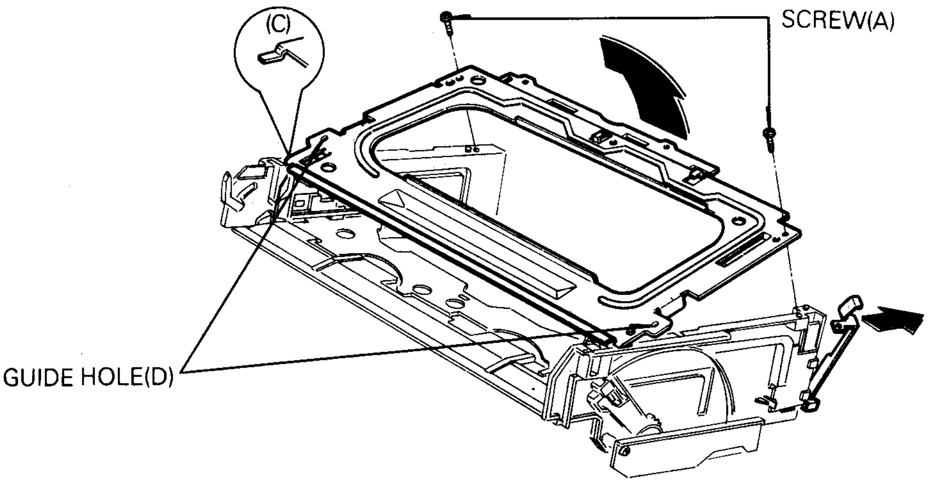


Fig. A-3 Top Plate

4. Carrier Bracket Assembly

4-1. Carrier Bracket Assembly(Fig. A-4-1)

1) Remove the Carrier Bracket Assembly by moving it in the direction of arrow(C).

*** NOTE**

1) When reassembling, be sure that parts(A) of Carrier Bracket Assembly are seated in parts(B) of Bracket(L),(R).

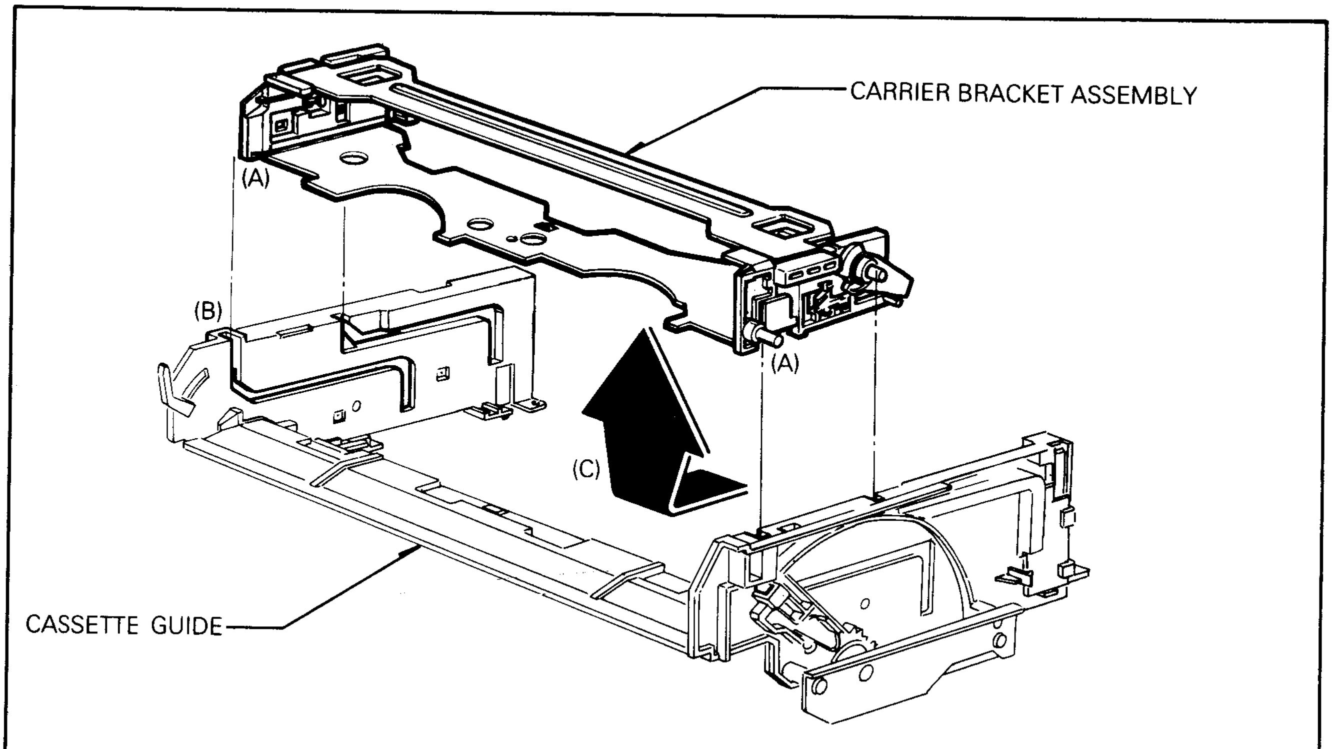

CARRIER BRACKET ASSEMBLY
(A)
(B)
(A)
(C)
CASSETTE GUIDE

Fig. A-4-1 Carrier Bracket Assembly

4-2. Cassette Opener(Fig. A-4-2)

1) Release the spring O.C from the Hook(A) and then release it from Hook(C) of cassette opener.
2) Remove the cassette opener by releasing the Hook(B) from the Holder(R).

4-3. Lid Opener(Fig. A-4-2)

1) Remove the lid opener by pushing it outward.

*** NOTE**

1) When reassembling, seat the upper part of the lid opener in the grooved of Holder(R) and push it inward.

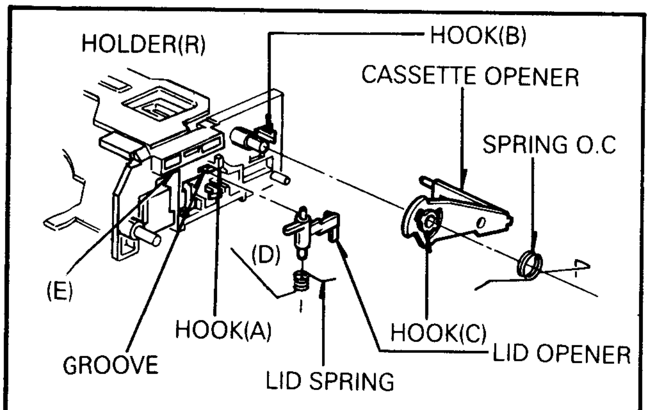

HOLDER(R)
HOOK(B)
CASSETTE OPENER
SPRING O.C
(D)
(E)
HOOK(A)
HOOK(C)
LID OPENER
GROOVE
LID SPRING

Fig. A-4-2. Cassette Door Opener/Lid Opener

4-4. Detect Lever and Detect Spring

1) Remove the spring detect.
2) Lower the side(A) of Detect Lever and then remove the Detect Lever by pushing it outward.

*** NOTE**

1) When reassembling, make sure that the part(C) of Detect Lever set in the part(B) of Holder(R).

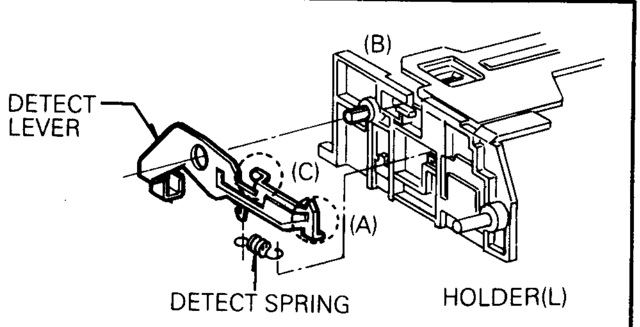

(B)
DETECT LEVER
(C)
(A)
DETECT SPRING
HOLDER(L)

Fig. A-4-3 Detect Lever, Detect Spring

4-5. Bracket Support (Fig. A-4-4)

1) Take the Support Bracket out by releasing hooks(A),(B).

*** NOTE**

1) When disassembling and reassembling, be careful because heavy force can damage the hooks.

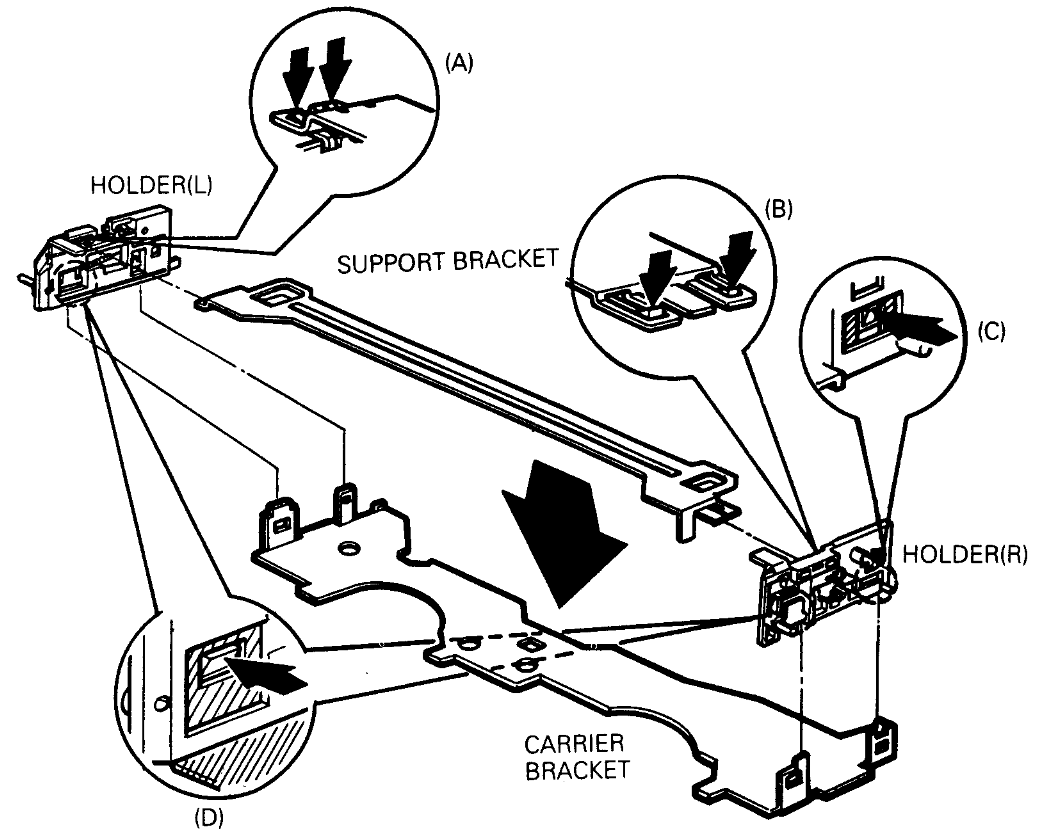

(A)
HOLDER(L)
(B)
SUPPORT BRACKET
(C)
HOLDER(R)
CARRIER BRACKET
(D)

Fig. A-4-4 Bracket Support/Bracket Carrier

4-6. Carrier Bracket Assembly(Fig. A-4-4)

1) Remove the Carrier Bracket by releasing hooks(C),(D).

5. Cassette Guide(Fig. A-5)

1) Remove the Switch Spring with the Front Loading Mechanism Assembly turned over.
2) Push two hooks(B) outward.
3) Remove the Cassette Guide by pushing two hooks(A). outward(if one is removed, the other will be easy to remove)

*** NOTE**

1) When reassembling

① Seat projections(E) of Cassette Guide in holes of Bracket Assembly(L),(R) and then engage the Hook(A).

② After finishing previous step, fix the Cassette Guide to the Bracket Assembly(L),(R) by pushing two hooks(B) inward.

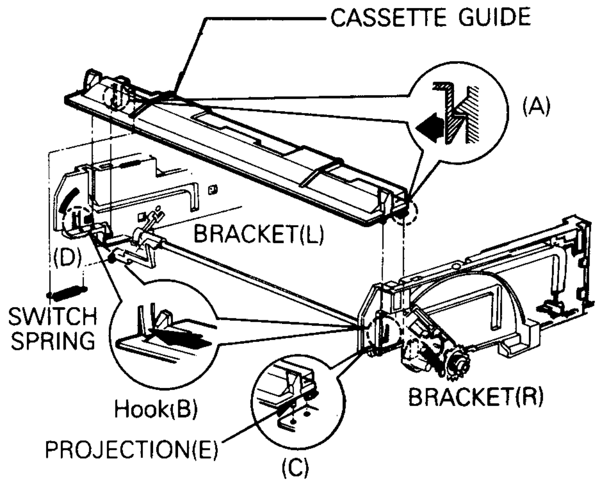

CASSETTE GUIDE
(A)
BRACKET(L)
(D)
SWITCH SPRING
Hook(B)
PROJECTION(E)
(C)
BRACKET(R)

Fig. A-5 Cassette Guide

6. Bracket Assembly Side (Fig. A-6-1)

1) Remove two screws(A) and then remove the Side Bracket Assembly and the Rack Gear N.D.

*** NOTE**

1) When reassembling

① Turn the Drive Gear Assembly in the direction of arrow (C).

② Reassemble the Rack Gear N.D. to the Side Bracket Assembly, as shown in Fig. A-6-2, and then reassemble it to the Bracket Assembly(L). This time the Assembling Figure should be the same as(B) at the rectangular hole of Bracket Side.

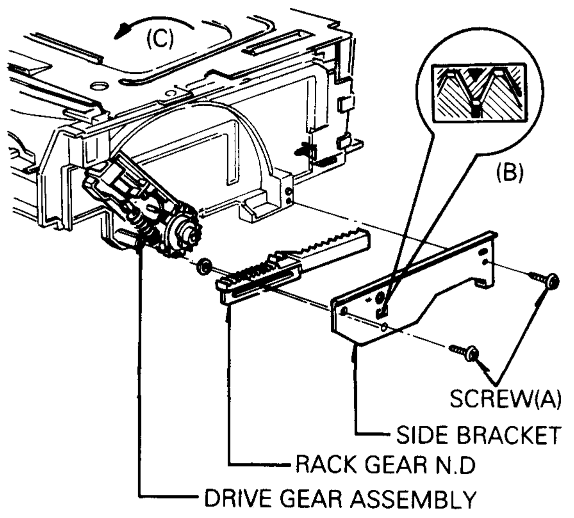

(C)
(B)
SCREW(A)
SIDE BRACKET
RACK GEAR N.D
DRIVE GEAR ASSEMBLY

Fig. A-6-1 Side Bracket Assembly

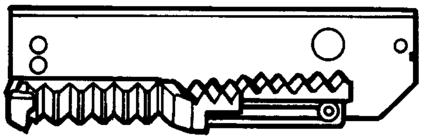


Fig. A-6-2

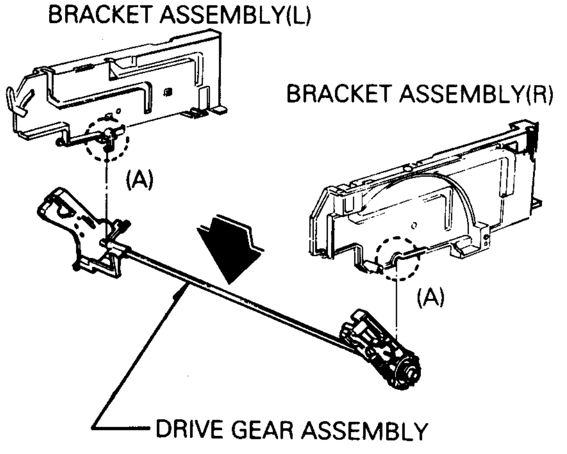

BRACKET ASSEMBLY(L)
BRACKET ASSEMBLY(R)
(A)
(A)
DRIVE GEAR ASSEMBLY

Fig. A-7 Bracket Assembly(L),(R)

7. Bracket Assembly(L),(R)(Fig. A-7)

1) Seperate the Bracket Assembly(L),(R) from the Gear Assembly Drive.

*** NOTE**

1) When reassembling, seat the shaft in the part(A) of Bracket Assembly(L),(R).

8. Door Opener(Fig. A-8)

1) Remove the Door Opener by pushing Hook(A) outward.

*** NOTE**

1) When reassembling, seat the part(B) of Door Opener in the hole(⬊) of Bracket(L).

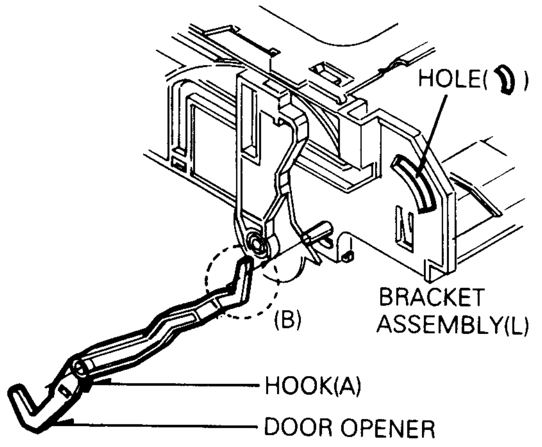

HOLE(⬊)
BRACKET ASSEMBLY(L)
(B)
HOOK(A)
DOOR OPENER

Fig. A-8 Door Opener

9. Drive Gear Assembly

9-1. Drive Gear Assembly(Fig. A-9-1)

1) Remove the Drive Gear Assembly from the Bracket Assembly(L),(R).

9-2. Cushion Spring(Fig. A-9-1)

1) Remove the cushion spring from the Gear R .

9-3. Cap-D(Fig. A-9-1)

1) Remove the Cap-D by lifting it up.

9-4. Spring C.C(Fig. A-9-1)

1) Remove the Spring C.C from the Gear R.

9-5. Gear C(Fig. A-9-1)

1) Remove the Gear C by lifting up when the projection of Gear C is aligned with the hole of Gear R while rotating the Gear C in the counterclockwise direction.

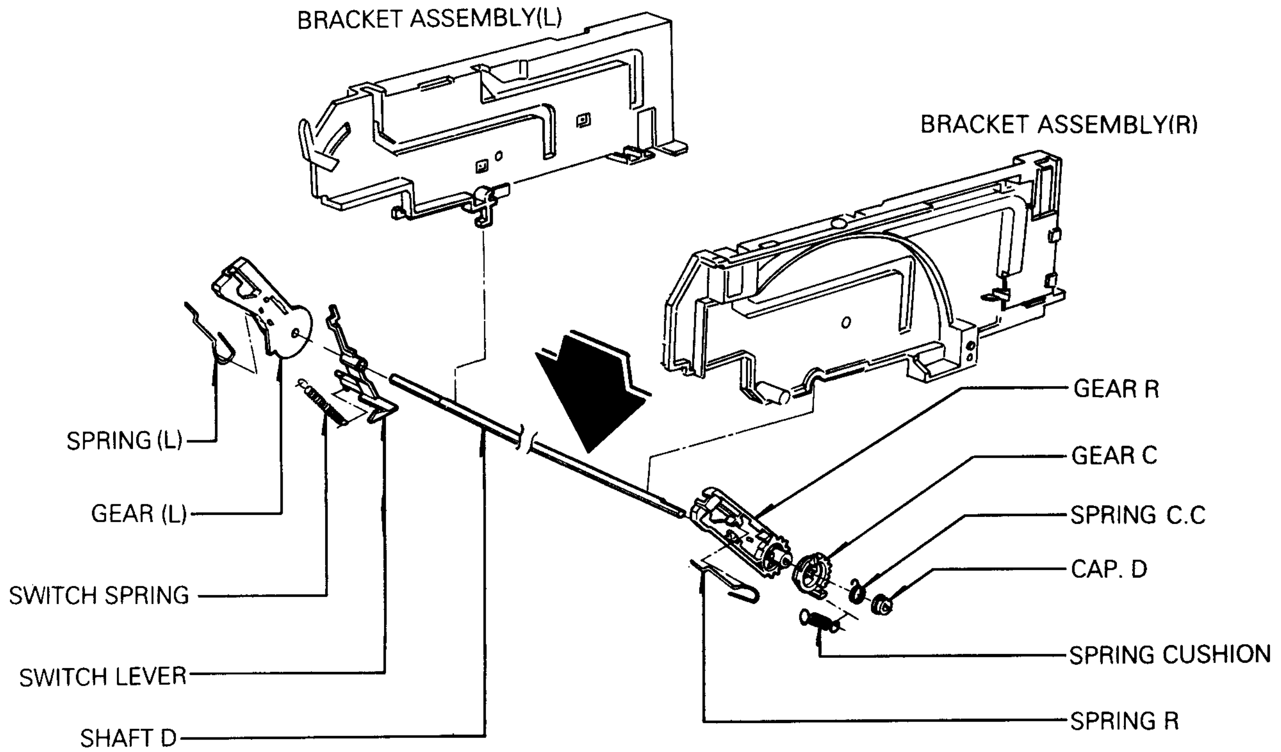

BRACKET ASSEMBLY(L)
BRACKET ASSEMBLY(R)
GEAR R
GEAR C
SPRING C.C
CAP. D
SPRING CUSHION
SPRING R
SPRING (L)
GEAR (L)
SWITCH SPRING
SWITCH LEVER
SHAFT D

Fig. A-9-1 Gear Assembly Drive

*** NOTE**

1) When reassembling, seat the projections of Gear R in the holes of Gear C when the projection of Gear R is aligned with the hole of Gear C, and then keep the Gear C turned in the clockwise direction.

9-6. Gear R(Fig. A-9-1)

1) Lift up the Gear R from the Shaft.

9-7. Spring R(Fig. A-9-2)

1) Remove the Spring R by releasing Hooks.

*** NOTE**

1) When reassembling, be certain Spring R in the part(A) of Gear R.

9-8. Gear L.(Fig. A-9-1)

1) Remove the Gear L from the shaft.

9-9. Spring L (Fig. A-9-2)

1) Remove the Spring L by releasing Hooks from the Gear L.

*** NOTE:** (Refer to the Spring R Section)

9-10. Switch Lever(Fig. A-9-1)

1) Remove the Switch Lever from the shaft.

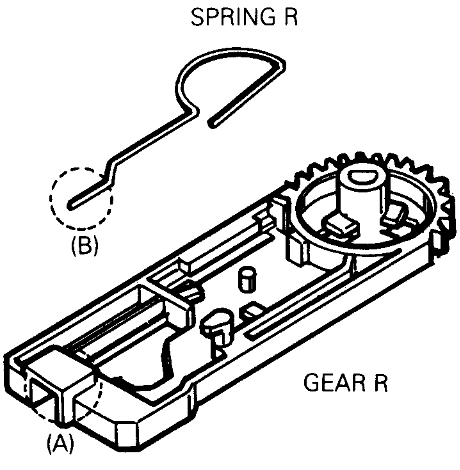
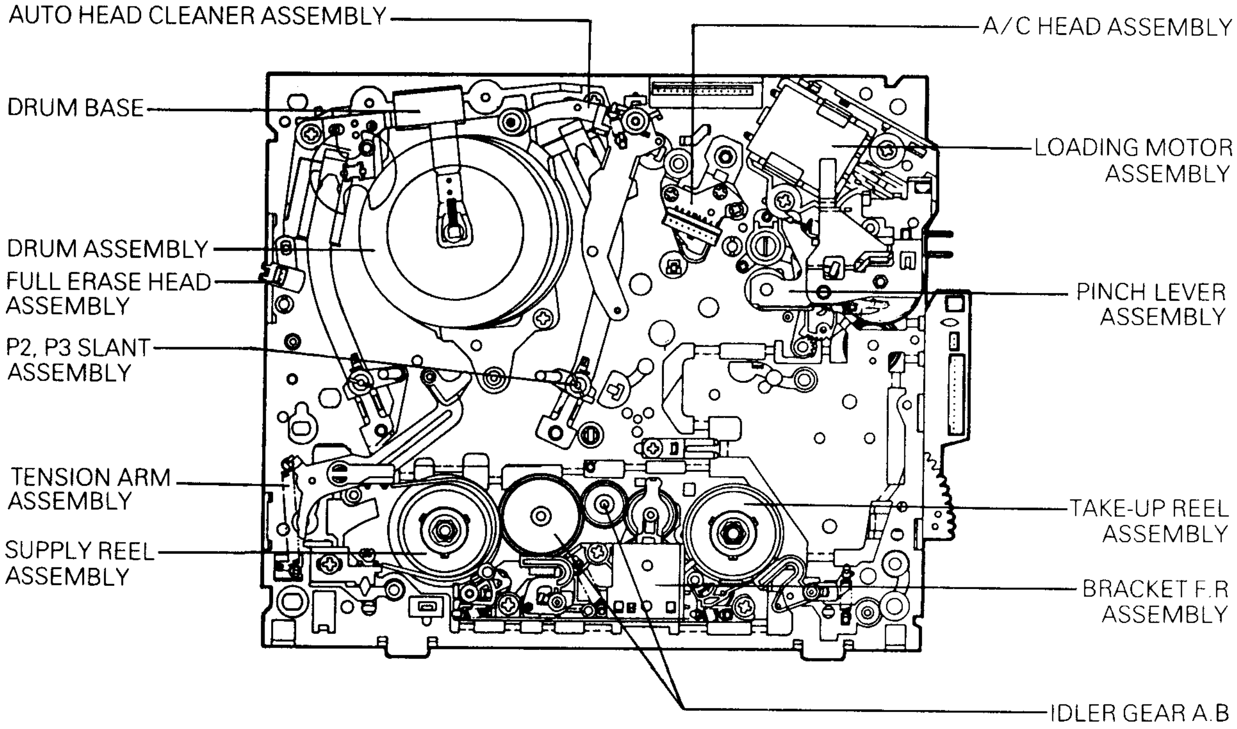

SPRING R
(B)
GEAR R
(A)

Fig. A-9-2 Spring R

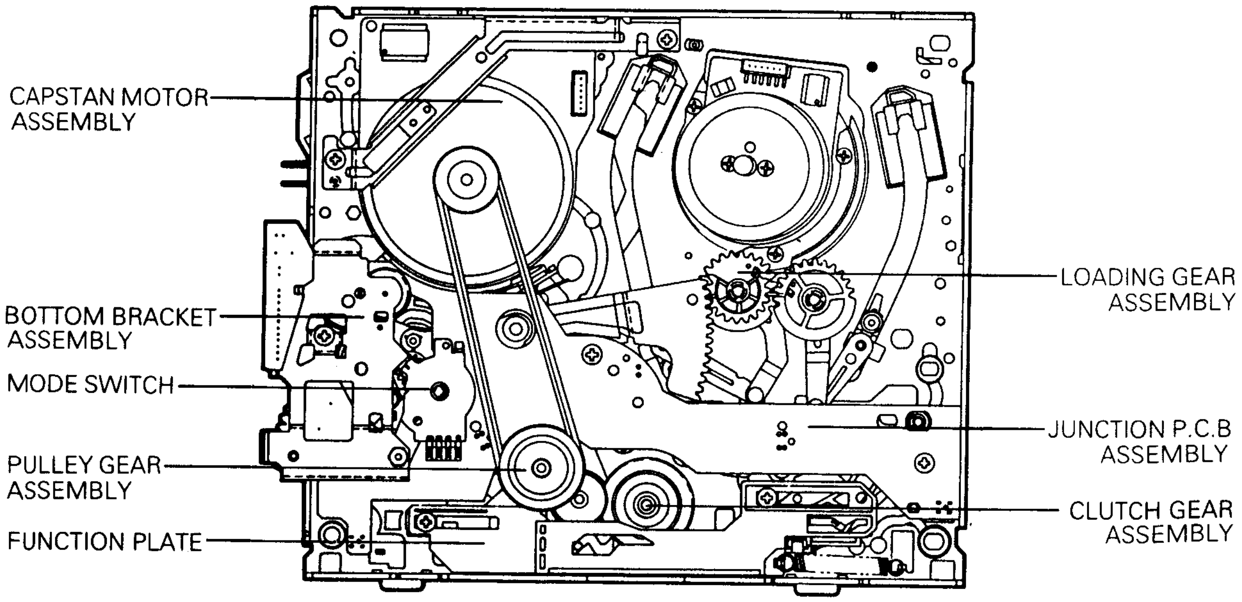
DECK MECHANISM DISASSEMBLY

• Deck Mechanism Parts Location

Top Side


AUTO HEAD CLEANER ASSEMBLY
A/C HEAD ASSEMBLY
DRUM BASE
LOADING MOTOR ASSEMBLY
DRUM ASSEMBLY
FULL ERASE HEAD ASSEMBLY
PINCH LEVER ASSEMBLY
P2, P3 SLANT ASSEMBLY
TENSION ARM ASSEMBLY
TAKE-UP REEL ASSEMBLY
SUPPLY REEL ASSEMBLY
BRACKET F.R ASSEMBLY
IDLER GEAR A.B

Bottom Side


CAPSTAN MOTOR ASSEMBLY
LOADING GEAR ASSEMBLY
BOTTOM BRACKET ASSEMBLY
MODE SWITCH
JUNCTION P.C.B ASSEMBLY
PULLEY GEAR ASSEMBLY
CLUTCH GEAR ASSEMBLY
FUNCTION PLATE

1. Auto Head Cleaner Assembly (Fig. B-1) (Optional Item)

1) Remove the Cleaner Arm Assembly (Auto Head Cleaner Assembly) by pushing Hook (B) outward.
2) Remove the cleaner Upper and the remove the Cleaner Upper Arm Sub Assembly.
3) Remove the Cleaner Spring.

*** NOTE**

1) When reassembling, do not touch the Video Head Tip with fingers or tools.

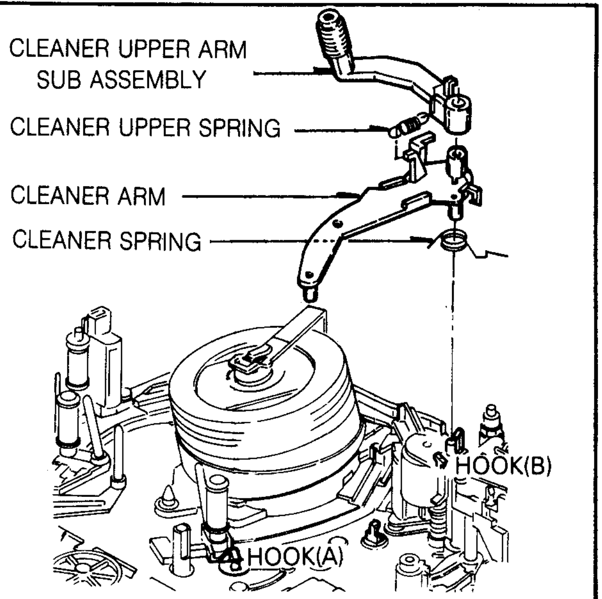


Fig. B-1 Auto Head Cleaner Assembly

2. Drum Assembly and Drum Base(Fig. B-2)

1) Remove the Auto Head Cleaner Assembly.
2) Unplug the connector with the Deck Mechanism Assembly turned over.
3) Loosen the screw(A) and then lift up the Drum Brush.
4) Remove two screws(B) and then lift up the Drum Assembly and Drum Base from the Deck Mechanism Assembly.
5) Separate the Drum Assembly from the Drum Base by Loosening three screws(C) on the back of Drum Base.

*** NOTE**

1) When disassembling and reassembling

① Do not touch the Video Head tip with fingers or tools. (Give special attention to disassembling and reassembling of Auto Head Cleaner Assembly)

② After reinstalling the Drum Brush, the Drum Brush should be aligned with the center of vertical axis of Drum Assembly.

③ After completing the reassembly, adjust the transportation system and the Servo P.G.

3. Upper and Lower Drum Assembly (Fig. B-3)

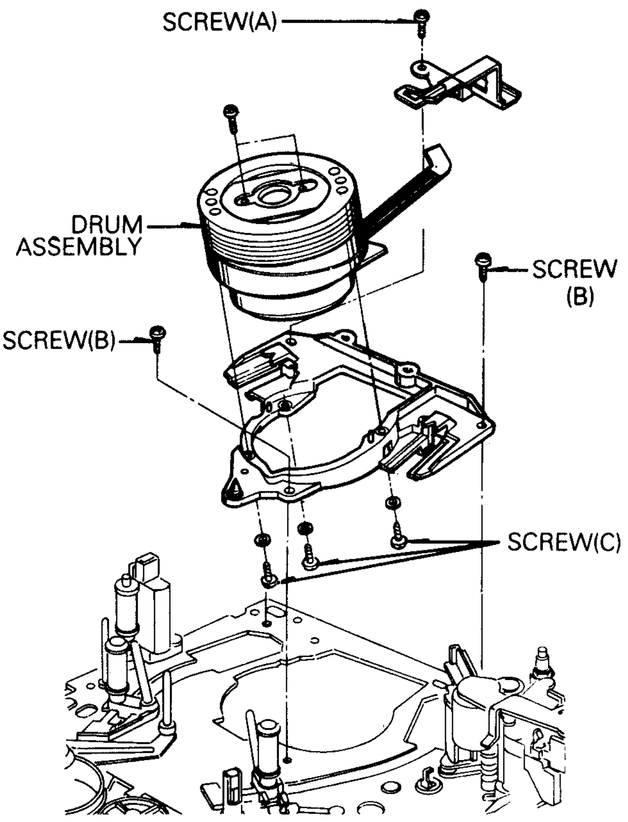


Fig. B-2 Drum Assembly/Drum Base

1) Remove the Drum Assembly and Drum Base from the Deck Mechanism Assembly.
2) Separate the Drum Assembly from the Drum Base.
3) Remove two screws(A).
4) Remove the P.C.B.
5) Separate the upper Drum Assembly from the Lower Drum Assembly.

*** NOTE**

1) When disassembling and reassembling

① Do not touch the Video Head Tip with fingers or tools.

② Make sure that the color(white) marked on the P.C.B of the upper Drum should coincide with the color(Green) marked on the Flange Assembly.

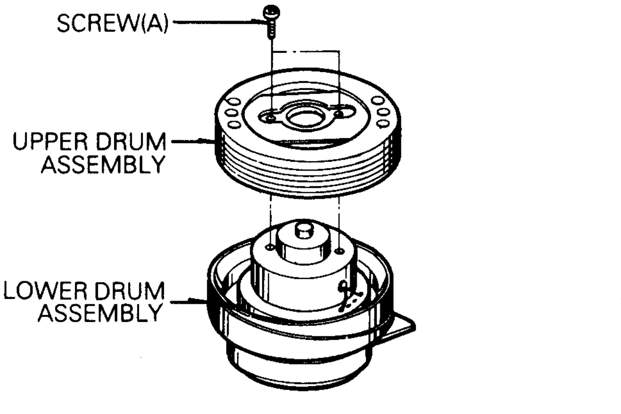


Fig. B-3 Upper/Lower Drum Assembly

4. A/C(Audio/Control) Head Assembly (Fig.B-4)

1) Unplug the connector
2) Remove the Nut(A), and then lift up the A/C Head Assembly.
3) Remove the Azimuth Adjusting Screw.
4) Remove two screws(B),(D) and then separate the A/C Head Assembly from the Base A/C Head Assembly.

*** NOTE**

1) When disassembling

① First of all, release the spring A/C.

② Do not touch the A/C Head Tip with fingers or tools.

③ After reinstalling the Audio Control Head Assembly, adjust the Tilt, Azimuth and Height of A/C Head.

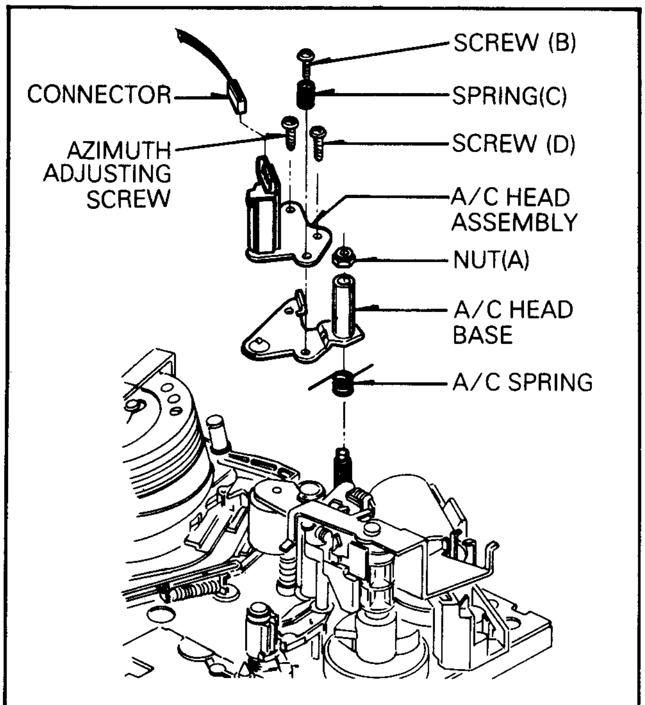

SCREW (B)
CONNECTOR
SPRING(C)
AZIMUTH ADJUSTING SCREW
SCREW (D)
A/C HEAD ASSEMBLY
NUT(A)
A/C HEAD BASE
A/C SPRING

Fig. B-4 A/C Head Assembly

5. Pinch Lever Assembly(Fig. B-5)

1) Remove one Nut, and then remove the Dew Bracket.
2) Lift up Pinch Lever Assembly.
3) Remove the Pinch Spring, and remove the Pinch Lever.
4) Remove the Stopper Spring and remove the Pinch Stopper by lifting it up when the Hook of Pinch Stopper is aligned with the hole of Pinch Arm while rotating the Pinch Stopper in the counterclockwise direction.
5) Remove the Pinch Cap, and then remove the Pinch Roller Assembly.

*** NOTE**

1) When disassembling and reassembling

① Be careful not to get any foreign substance on the Roller.

② When disassembling the Pinch Cap, be careful not to damage the Pinch Arm.

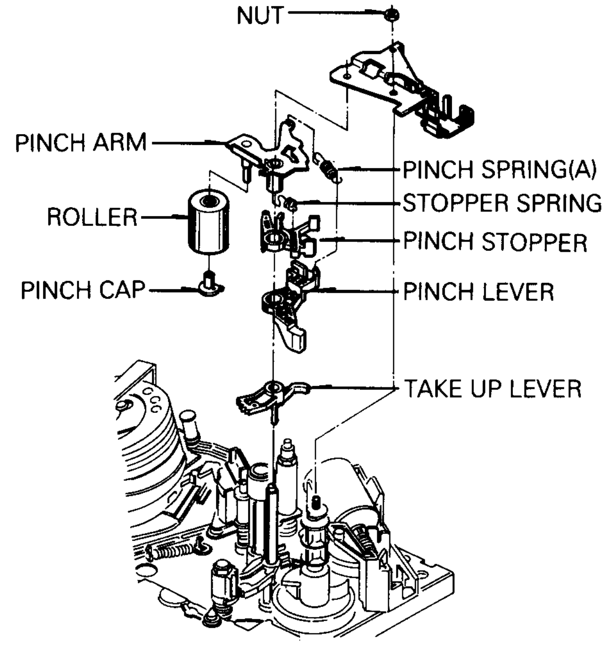

NUT
PINCH ARM
PINCH SPRING(A)
ROLLER
STOPPER SPRING
PINCH STOPPER
PINCH CAP
PINCH LEVER
TAKE UP LEVER

Fig. B-5 Lever Assembly Pinch

6. Loading Motor Assembly(Fig. B-6-1, B-6-2)

1) Remove the Dew Bracket.
2) Unplug the connector from the Junction P.C.B Assembly
3) Remove two screws(A).
4) Remove the worm wheel by pushing it down.
5) Remove the Loading Motor Assembly by pushing(C) and (D) outward.
6) Remove the worm Gear Assembly from the Loading Motor Assembly by pushing it.

*** NOTE**

1) When reassembling

① Make sure that the worm assembly is seated in the axis of Loading Motor.

② Two grooves(G) of Loading Motor should be turned up and two projections(F) of Bracket Assembly should be seated in each at the two holes(E)(Fig. B-6-1).

③ Take notice of the polarity of the Loading Motor.

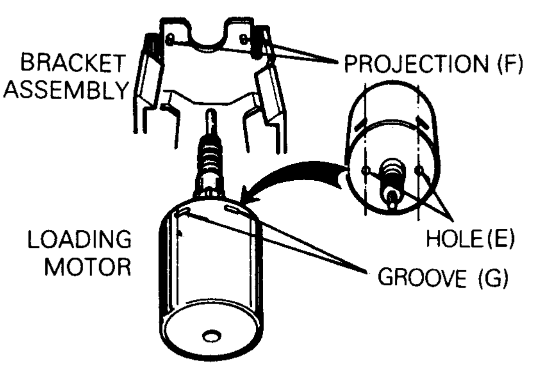

BRACKET ASSEMBLY
PROJECTION (F)
LOADING MOTOR
HOLE(E)
GROOVE (G)

Fig. B-6-1

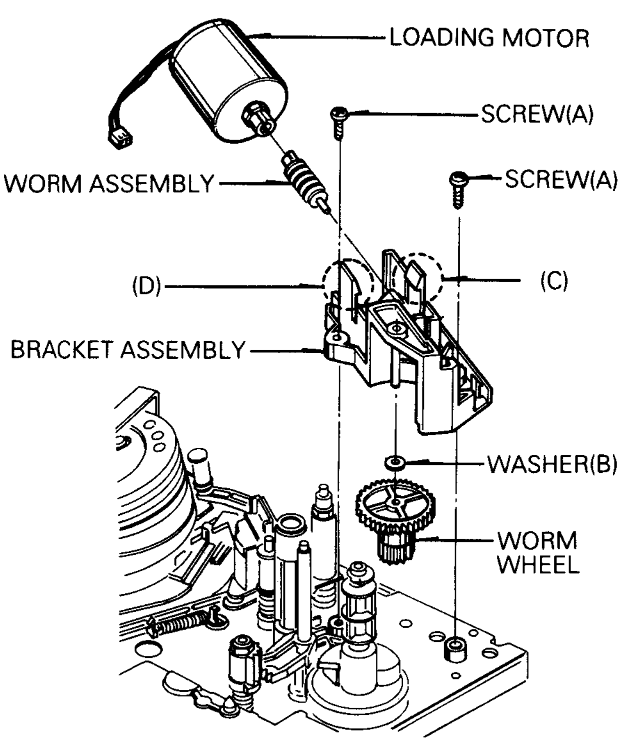

LOADING MOTOR
SCREW(A)
WORM ASSEMBLY
SCREW(A)
(D)
(C)
BRACKET ASSEMBLY
WASHER(B)
WORM WHEEL

Fig. B-6-2 Loading Motor Assembly

7. Take Up Lever(Fig. B-7)

1) Remove the Dew Bracket.
2) Remove the Pinch Lever Assembly.
3) Remove the Take-Up Lever by pushing the hook(A) outward.

*** NOTE**

1) When disassembling and reassembling

① When disassembling the Take-Up Lever, be careful not to break the Hook(A).

② When reassemble the Take-Up Lever,align the appendant Gear of Lever Take-Up with the appendant Gear of Take-up Arm

③ Reassemble the Take-Up Lever completely by hooking (A).

8. Take Up Arm Assembly(Fig. B-8)

1) Remove the Dew Bracket, Pinch Gear, and the Take-Up Lever
2) Remove one Nut(A).
3) Remove the Take-Up Arm Assembly by lifting it up.
4) Remove the spring(B).

*** NOTE**

1) When reassembling

① Align the Gear of Take-Up Arm with the Gear of Take-Up Lever.

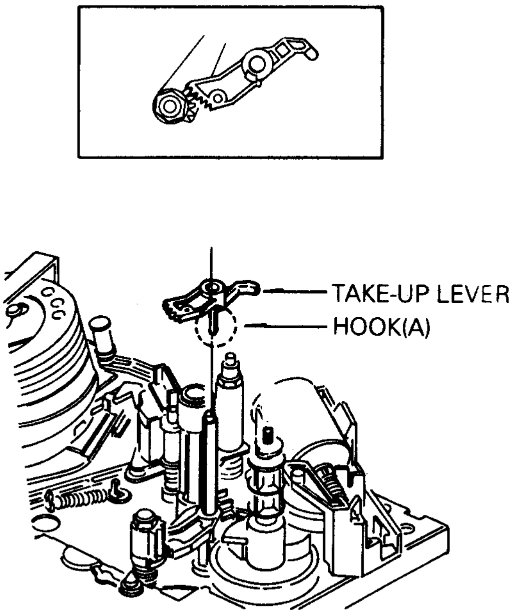

TAKE-UP LEVER
HOOK(A)

Fig. B-7. Take-Up Lever

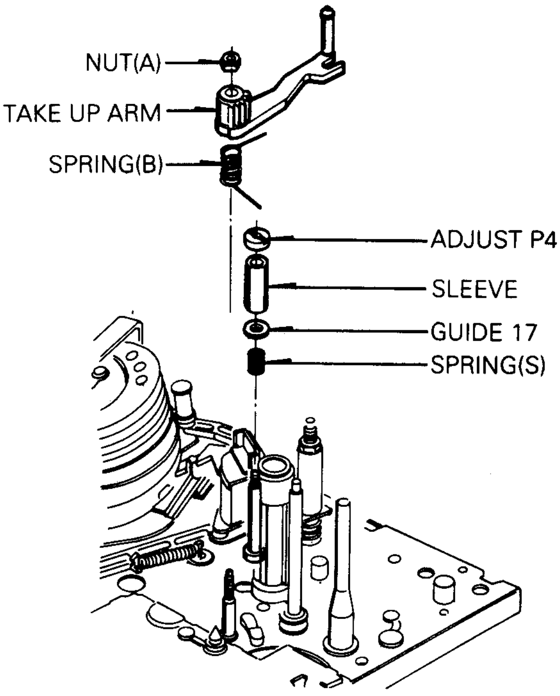

NUT(A)
TAKE UP ARM
SPRING(B)
ADJUST P4
SLEEVE
GUIDE 17
SPRING(S)

Fig. B-8 Take-Up Arm Assembly/P4

9. P4 Assembly(Fig. B-8)

1) Remove the Adjust P4.
2) Remove the Sleeve.
3) Remove the Guide 17.
4) Remove the Spring

10. Pinch Gear

1) Remove one Nut(A) and then remove the Dew Bracket.
2) Remove the Pinch Lever Assembly by lifting it up.
3) Remove the Loading Motor Assembly.
4) Remove the Take Up Lever.
5) Remove the Pinch Gear Assembly.

*** NOTE**

1) When reassembling, align the hole(A) of Pinch Gear with the hole of chassis, and the hole(C) of Pinch Gear with the groove(D) of the P.C.Gear. Hole(E) of chassis should be aligned with the hole of P.C.Gear.

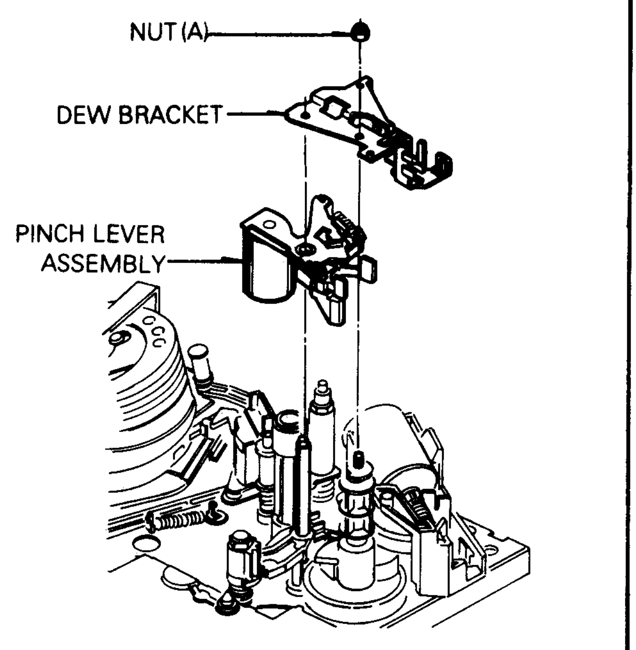


Fig. B-10-1 Pinch Gear Assembly

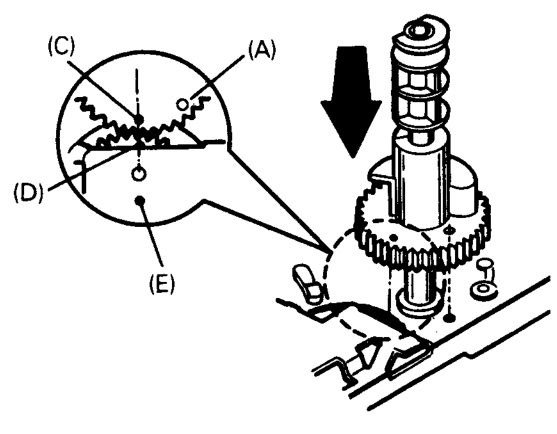


Fig. B-10-2 Pinch Gear

11. FE(Full Erase) Head Assembly(Fig. B-11) (Optional Item)

1) Unplug the connector.
2) Remove one screw(A), and then remove the FE Head.

*** NOTE**

1) When disassembling and reassembling
① Do not touch the Video Head Tip with fingers or tools.

12. P1 Assembly(Fig. B-11)

1) Remove the Adjust P1.
2) Remove the Guide 17.
3) Remove the Roller.
4) Remove the Sleeve.
5) Remove the Guide 17.
6) Remove the Spring.

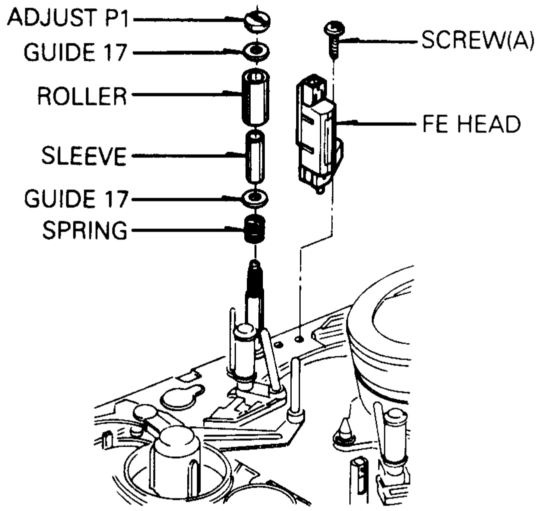


Fig. B-11 FE Head/P1

13. Tension Arm Assembly(Fig. B-13)

1) Remove one screw(C).
2) Remove the Tension Spring.
3) Remove the Tension Arm Assembly by pushing hooks outward with the Deck Mechanism Assembly turned over.
4) Remove the Tension Band Assembly from the Tension Arm by pushing Hooks of Holder(A).

*** NOTE**

1) When disassembling and reassembling, give special attention to the disassembling and reassembling of Tension Arm Assembly, because the Tension Band is interposed between the Supply Reel and the Soft Brake.

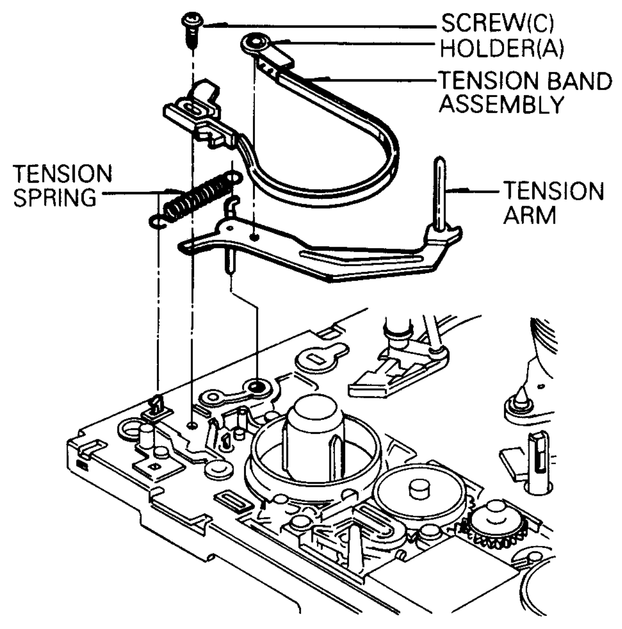

SCREW(C)
HOLDER(A)
TENSION BAND ASSEMBLY
TENSION SPRING
TENSION ARM

Fig. B-13 Tension Arm Assembly

14. Supply Soft/Supply Main/Take-Up Soft/Take-Up Main Brake Assembly

1) Supply Soft Brake(SSB)
   ① Remove the SSB Spring.
   ② Remove the SSB.
2) Supply Main Brake(SMB)
   ① Remove the SMB Spring.
   ② Remove the SMB.
3) Take Up Soft Brake(TSB)
   ① Remove the TSB Spring.

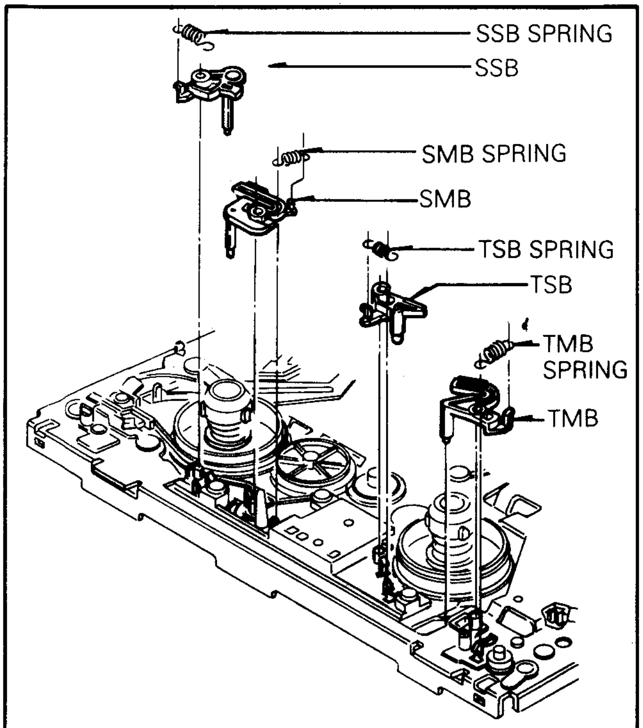

SSB SPRING
SSB
SMB SPRING
SMB
TSB SPRING
TSB
TMB SPRING
TMB

Fig. B-14 SMB/SSB/TMB/TSB

   ② Remove the TSB.
4) Take-Up Main Brake(TMB)
   ① Remove the TMB Spring.
   ② Remove the TMB.

15. Bracket F/R(FF/Rewind) Assembly (Fig. B-15)

1) Remove the TMB.
2) Remove the Washer(A), and then remove the Gear F.R.
3) Remove three screws, and then remove Bracket F/R Assembly from the Deck Mechanism Assembly.
4) Remove the Washer(B), and spring Up/D, and then remove the Gear Up/D.
5) Remove the shaft(C), and then remove the Arm F.R, Lever F.R and Spring F.R.

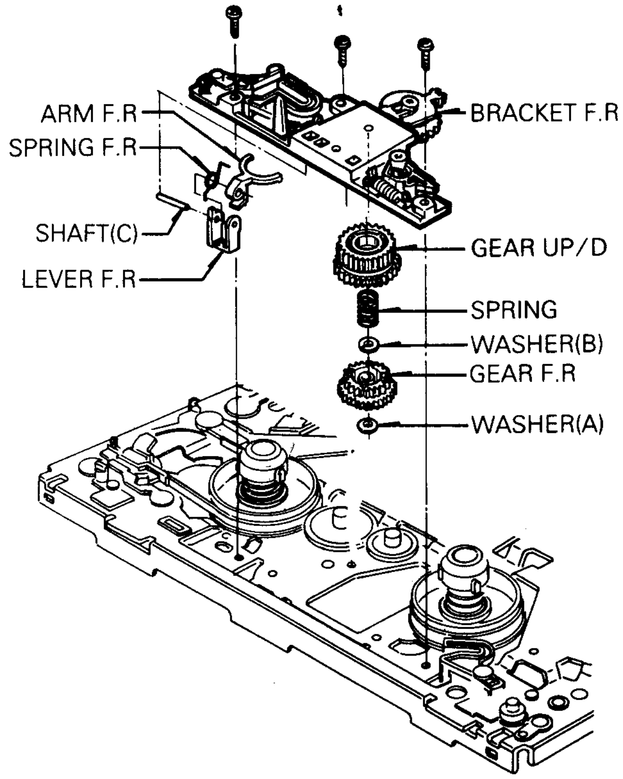

ARM F.R
SPRING F.R
SHAFT(C)
LEVER F.R
BRACKET F.R
GEAR UP/D
SPRING
WASHER(B)
GEAR F.R
WASHER(A)

Fig. B-15 Bracket F.R Assembly

16. Supply Reel Assembly(Fig. B-16)

1) Remove the Tension Band Assembly.
2) Remove the Bracket F/R.
3) Lift up the Supply Reel Assembly from the Deck Mechanism Assembly.
4) Separate the Reel Cap from the Supply Reel by taking it out of Hooks(A).

*** NOTE**

1) When reassembling

① Make sure that the Supply and Take Up Reel are not exchanged.

② After reinstalling the Supply Reel Assembly, Adjust the Tension.

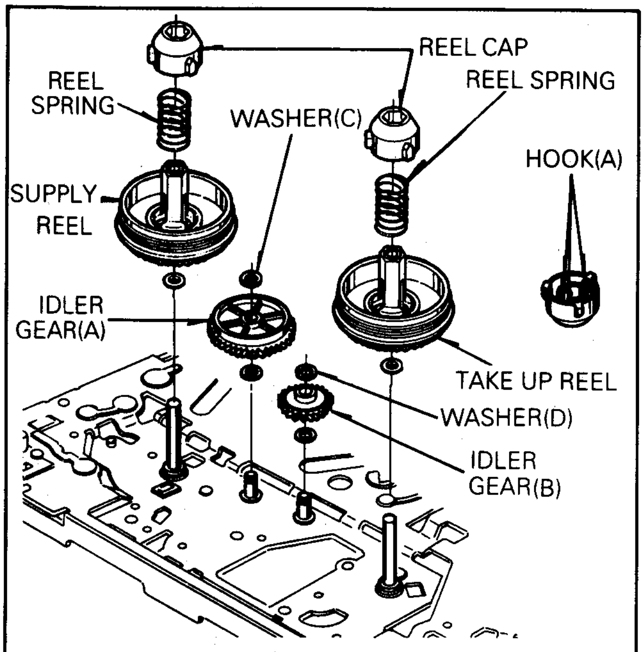

REEL CAP
REEL SPRING
REEL SPRING
WASHER(C)
HOOK(A)
SUPPLY REEL
IDLER GEAR(A)
TAKE UP REEL
WASHER(D)
IDLER GEAR(B)

Fig. B-16 Supply Reel Assembly

17. Idler Gear(A), (B)(Fig. B-16)

1) After removing the Supply Reel, and supply Main Brake Assembly, remove the washer(C) and remove the Idler Gear(A).
2) Remove the Washer(D) and remove the Idler Gear(B).

18. Pulley Gear Assembly(Fig. B-18)

1) Turn over the Deck Mechanism Assembly.
2) Remove the Capstan Belt.
3) Remove the Washer(A) and lift up the Pulley Gear.

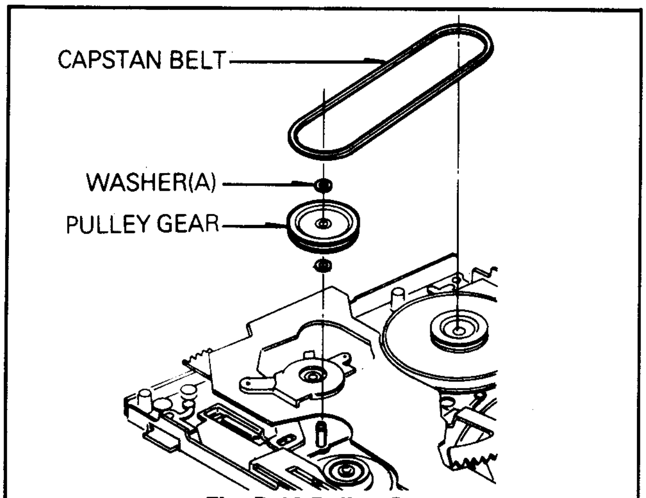

CAPSTAN BELT
WASHER(A)
PULLEY GEAR

Fig. B-18 Pulley Gear

19. Bracket Bottom Assembly(Fig. B-19)

1) Remove one screw(A).
2) Remove one Hexagonal Nut, and then lift up the Bracket Bottom Assembly.
3) Remove one Washer, and lift up the Ratchet Gear 1.

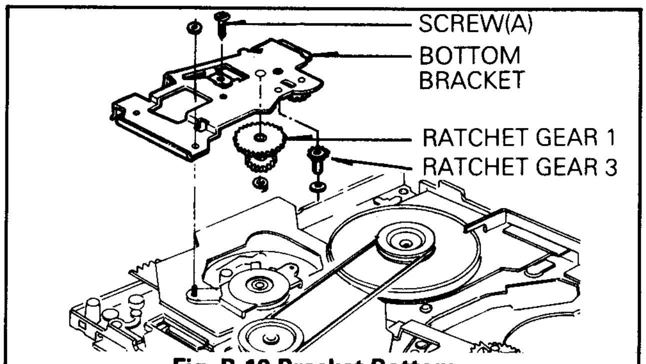

SCREW(A)
BOTTOM BRACKET
RATCHET GEAR 1
RATCHET GEAR 3

Fig. B-19 Bracket Bottom

4) Remove the washer, and then remove Ratchet Gear 3 from the Bottom Bracket.

20. Junction PCB(Printed Circuit Board) Assembly (Fig. B-20-1)

1) Remove the Bottom Bracket Assembly.
2) Remove two screws(A),(B) and then remove the Junction P.C.B Assembly.
3) Remove the Mode Switch from the Junction P.C.B Assembly.
4) Remove the Reel Sensors, Sensor LEDS and each holder from the Junction P.C.B(Fig. B-20-2).

*** NOTE**

1) When reassembling the Mode Switch, the groove(V) and (U) of Mode Switch should be at their original place in the Eject Mode.

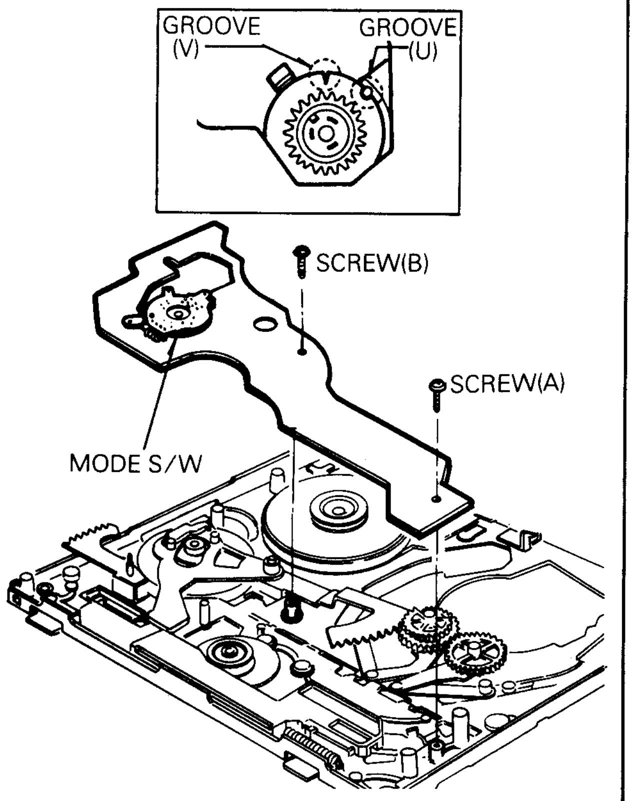

GROOVE (V)
GROOVE (U)
SCREW(B)
SCREW(A)
MODE S/W

Fig. B-20-1 Junction PCB Assembly

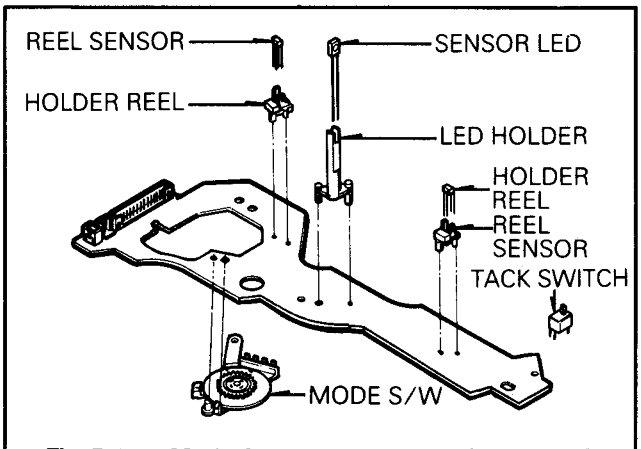

REEL SENSOR
SENSOR LED
HOLDER REEL
LED HOLDER
HOLDER REEL
REEL SENSOR
TACK SWITCH
MODE S/W

Fig. B-20-2 Mode S/W/Reel Sensor/Sensor Led

21. Capstan Motor and Brake Assembly (Fig. B-21-1)

1) Remove the Junction P.C.B Assembly
2) Hook the end of Capstan Brake Spring to the projection of Capstan Brake and then remove the Capstan Brake Assembly by lifting it up(Fig. B-21-2).
3) Remove two Screws(A), and then remove the Bracket C-Guide.
4) Remove the Connector.
5) Remove three screws(B), and then remove the Capstan Motor Assembly from the Deck Mechanism Assembly.

*** NOTE**

1) When disassembling and reassembling, hook end of the spring on the projection of Cap-Brake and remove it by lifting it up. Reassemble it in the opposite manner.

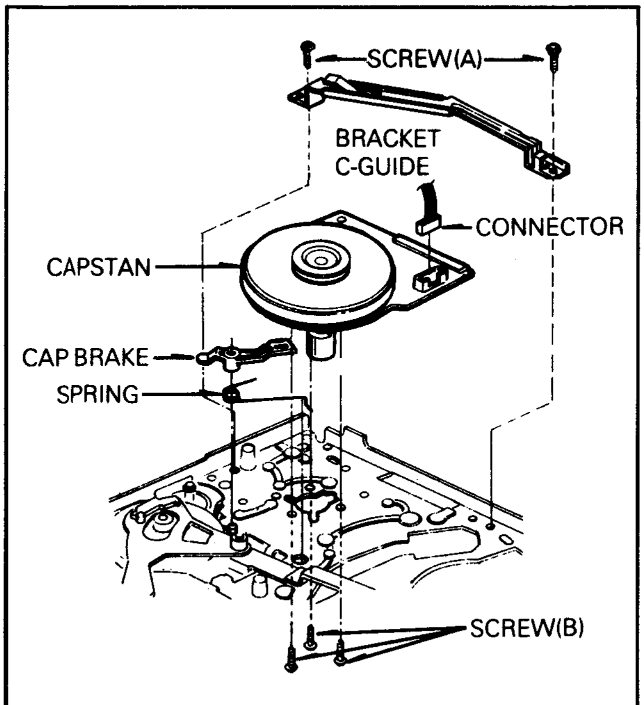

SCREW(A)
BRACKET C-GUIDE
CONNECTOR
CAPSTAN
CAP BRAKE
SPRING
SCREW(B)

Fig. B-21-1 Capstan Motor Assembly

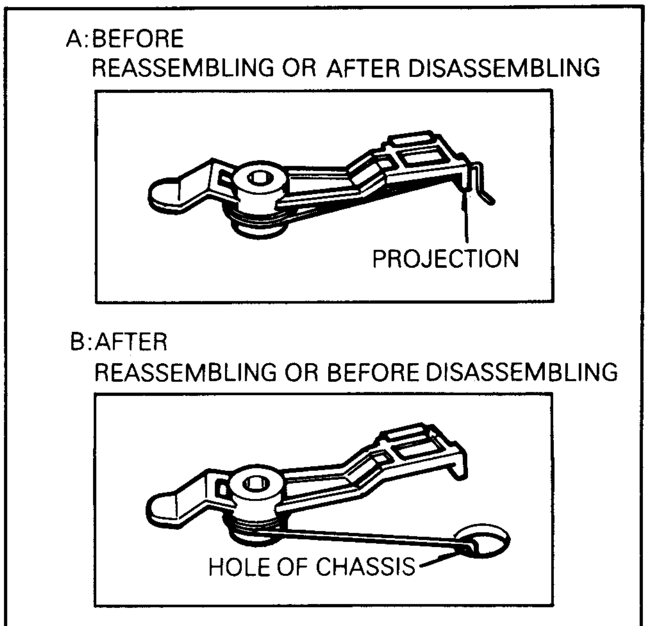

A:BEFORE
REASSEMBLING OR AFTER DISASSEMBLING
PROJECTION
B:AFTER
REASSEMBLING OR BEFORE DISASSEMBLING
HOLE OF CHASSIS

Fig. B-21-2 CAP Brake Assembly

22. Function Plate(Fig. B-22)

1) Remove two screws(B) in Eject Mode.
2) Remove the Function Plate Spring.
3) Remove the Function Plate.

*** NOTE**

1) When reassembling,the groove of Lower part of Function Plate should be aligned with the shaft of Tension Lever Assembly(Fig. B-28).

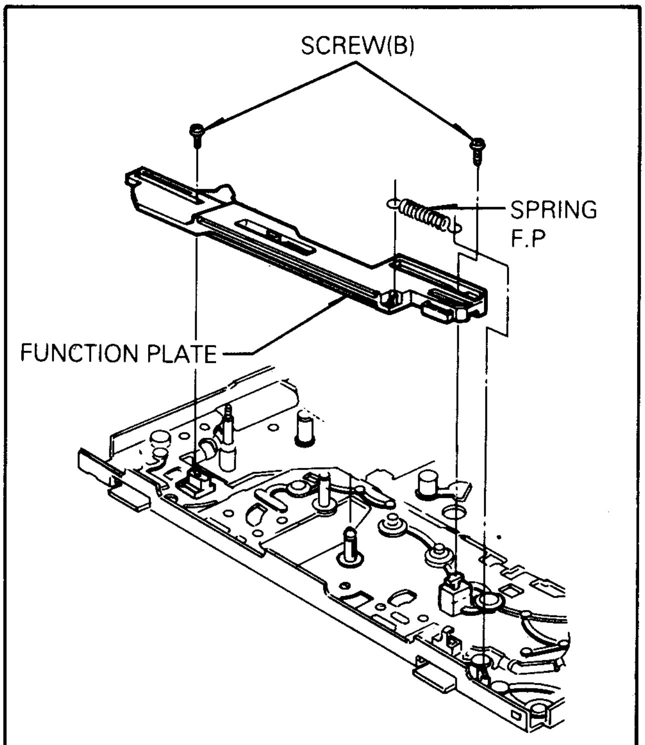

SCREW(B)
SPRING F.P
FUNCTION PLATE

Fig. B-22 Function Plate

23. Ratchet Lever Assembly(Fig. B-23)

1) Remove the Function Plate.
2) Remove the Junction P.C.B Assembly.
3) Remove the Washer(A) and then remove the Ratchet Lever Assembly.
4) Remove the Ratchet Spring.
5) Remove the Ratchet Lever from the Ratchet 17 by lifting it up when the hook of it is aligned with the hole of Ratchet 17 while rotating it counterclockwise direction.
6) Remove the Washer(B), and turn over the Ratchet 17 and then remove the Slant Pin, Spring F, Lever.

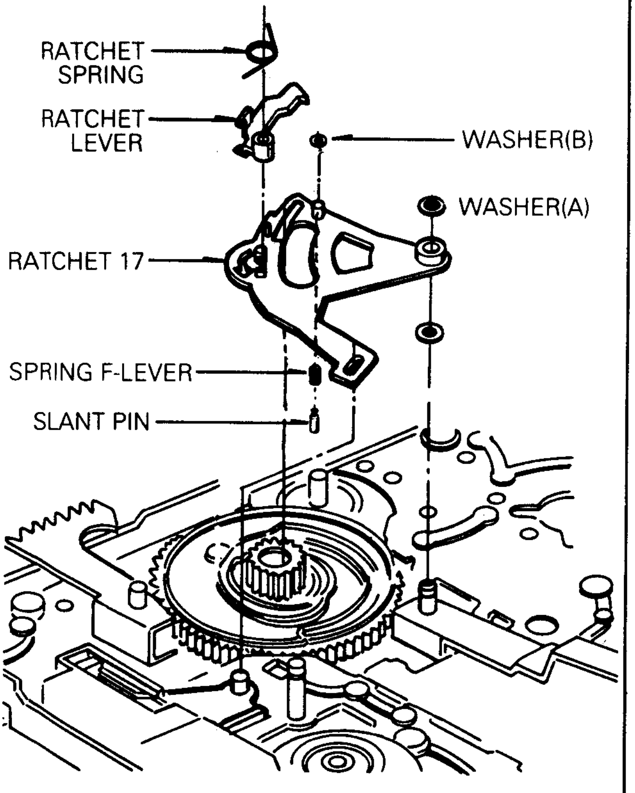

RATCHET SPRING
RATCHET LEVER
WASHER(B)
WASHER(A)
RATCHET 17
SPRING F-LEVER
SLANT PIN

Fig. B-23 Ratchet Lever Assembly

24. Cam Gear/Rack Gear T/Rack Gear FL(Fig. B-24-2)

1) Remove the washer(A) and remove the Ratchet Lever Assembly. (Fig. B-24-1).
2) Remove the washer(B), and then remove the Cam Gear (Fig. B-24-2).
3) Remove the Rack Gear F.L.(Fig. B-24-3)
4) Remove the Rack Gear T.(Fig. B-24-3)

*** NOTE**

1) When reassembling

① Align the Projection of Rack Gear T with the hole of Loading Gear.

② Drive the Rack Gear F.L in the direction of arrow(D).

③ Hole of Cam should be aligned with the hole of chassis, and the groove(⋈) of Cam Gear should be aligned with the hole of PC Gear(Fig. B-25)

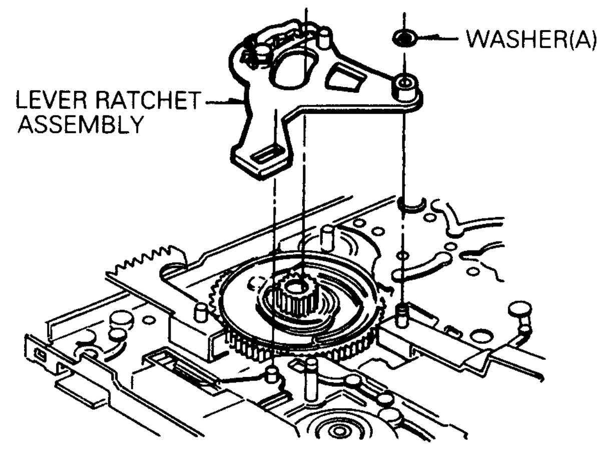

WASHER(A)
LEVER RATCHET ASSEMBLY

Fig. B-24-1 Lever Ratchet Assembly

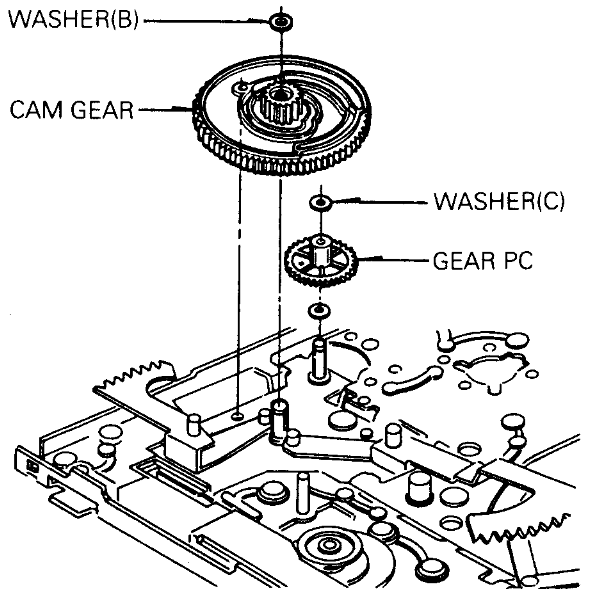

WASHER(B)
CAM GEAR
WASHER(C)
GEAR PC

Fig. B-24-2 CAM/PC Gear

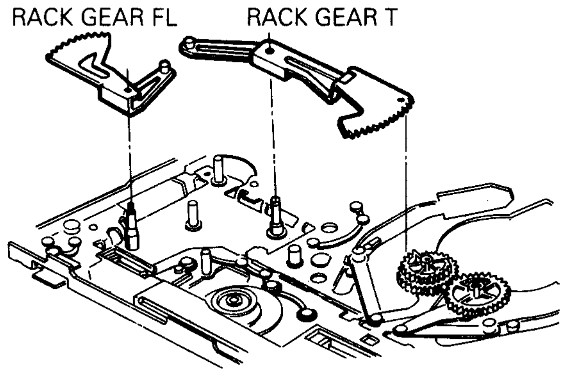

RACK GEAR FL
RACK GEAR T

Fig. B-24-3 Rack Gear F.L/Rack Gear T

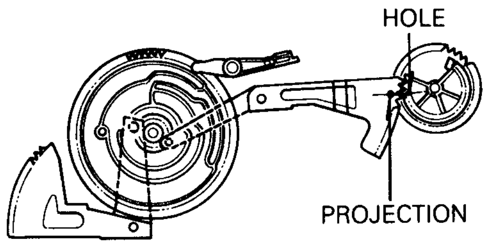


Fig. B-24-4 Rack Gear F.L/Rack Gear T/CAM Gear

25. PC Gear(Fig. B-25)

1) Remove the washer(C).
2) Remove the P.C Gear by lifting it up.

*** NOTE**

1) When reassembling

① The Groove of PC Gear should be aligned with the groove(V) of Cam Gear, and another hole of it should be aligned with the hole of chassis (Fig. B-25).

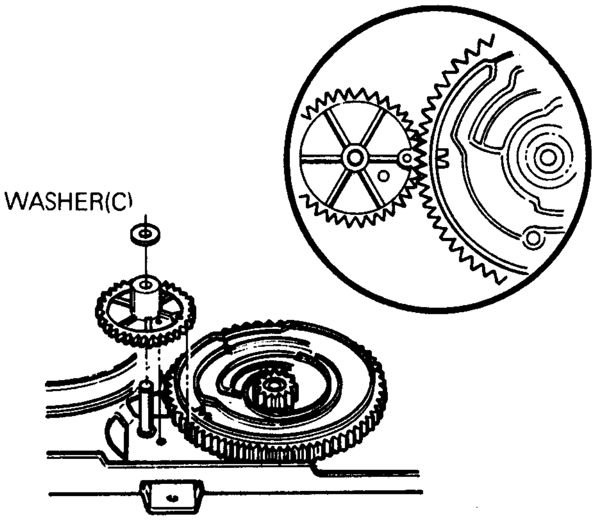


Fig. B-25 PC Gear

26. P2 and P3 Slant Assembly(Fig. B-26)

1) After finishing the disassembly of Drum Assembly, remove the P2 and P3 Slant Assembly by turning the Loading Gear(R) in the clockwise direction.(Loading direction)
2) Loosen the set screws.
3) Remove the Roller Guide from the Slant Base.

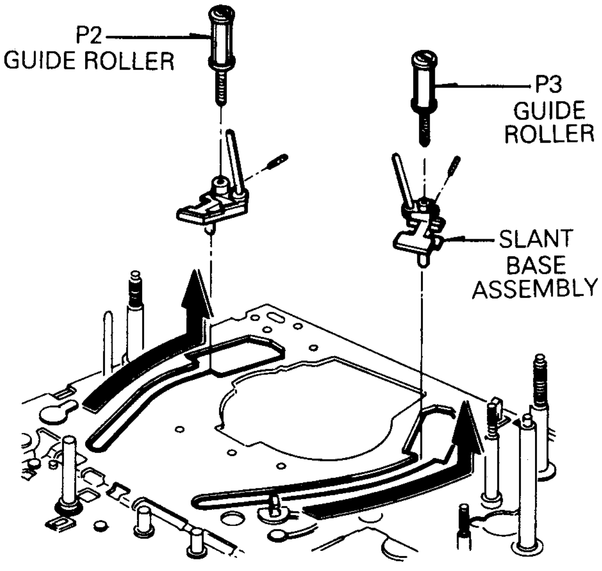


Fig. B-26 Slant Assembly

*** NOTE**

1) When disassembling and reassembling

① Use a Hexagonal wrehch to remove set screw.

② Take notice that the P2 and P3 Slant Assembly should not be changed from their original place.

27. Loading Gear Assembly(L),(R) (Fig. B-27)

1) Remove the Cam Gear, Rack-T.
2) Remove the P2 and P3 Slant Assembly by turning the Loading Gear(L),(R) in the Loading direction
3) Lift up the Loading Gear Assembly(L),(R) from the Deck Mechanism Assembly.
4) Remove the Spring Load(L),(R).
5) Separate the Loading Gear(L), (R) from Lever Load(L),(R).

*** NOTE**

1) When reassembling

① Make sure that the Loading Gear(L) and (R) should not be changed from their original place.

② Align the groove of Loading Gear(L),(O) with the groove of Gear(R),(O).

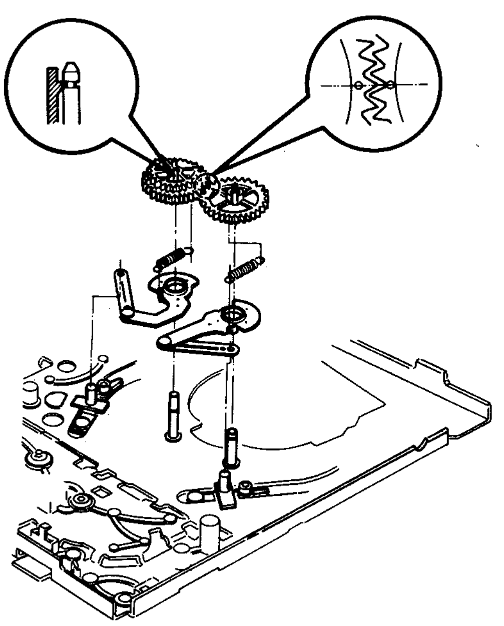


Fig. B-27 Loading Gear Assembly

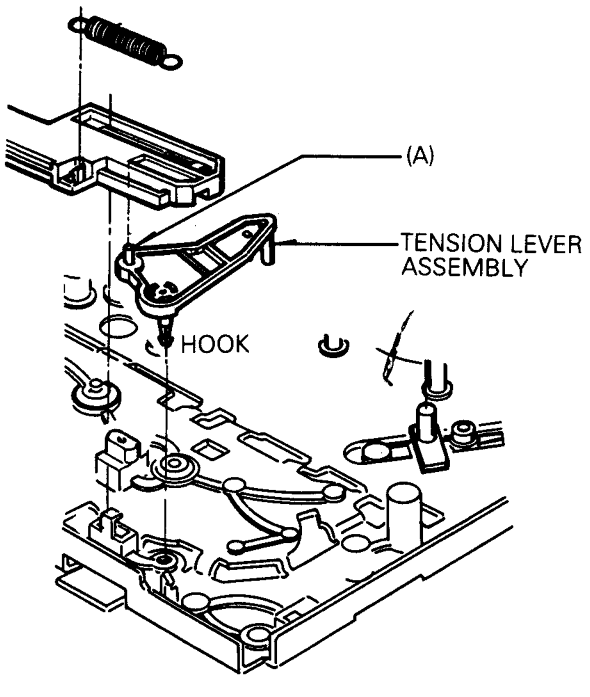


Fig. B-28 Tension Lever Assembly

28. Tension Lever Assembly(Fig. B-28)

1) Remove the Function Plate.
2) Remove the Tension Lever Assembly by pushing hooks inward.

*** NOTE**

1) When reassembling

① Set the part(A) of Tension Lever Assembly in the groove of Lower part of Function Plate.

② After reinstalling the Tension Lever Assembly, adjust the Tension Post and the Tension with a Tension Cassette.

29. Clutch Gear Assembly(Fig. B-29)

1) Remove the Pulley Gear.
2) Remove the Plate Function.
3) Remove the washer(A), and then remove the Clutch Gear Assembly.

*** NOTE**

1) When reassembling

① Do not disassemble the Clutch Gear Assembly any futher, because Torque adjustment is not adjustible.

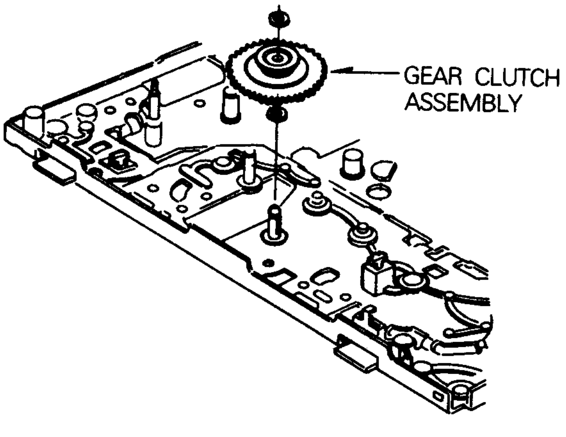


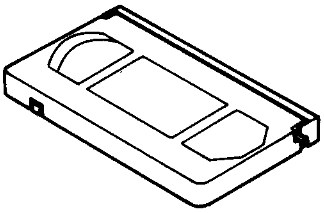
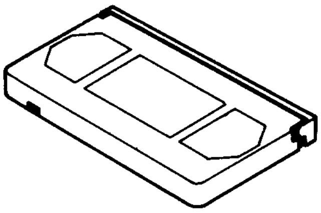
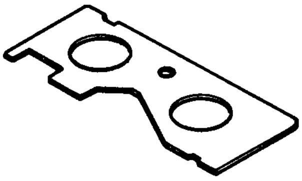
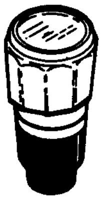
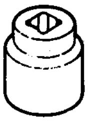
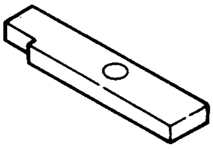
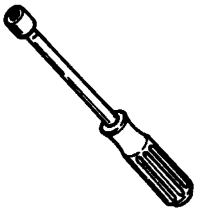
Fig. B-29 Gear Clutch Assembly

30. Take Up Reel Assembly(Fig. B-16)

1) Remove the TMB(Fig. B-14)
2) Lift up the Take-up Reel Assembly from the Deck Mechanism Assembly.
3) Separate the Reel Cap and Spring from the Take-Up Reel by releasing Hooks(S).

MECHANISM ADJUSTMENTS

- **Tools and Fixtures for Deck**

1. Back tension meter Parts No ; D00-D006 	2. NTSC alignment tape Parts No NTSC ; DTN-0001 PAL ; DTN-0002 	3. Master plane Parts No ; RJ10028 
4. Torque gauge Parts No ; D00-D002 	5. Torque gauge adaptor Parts No ; D09-R001 	6. Reel table height fixture Parts No ; RJ10027 
7. Post height adjusting driver Parts No ; DTL-0005 	8. M3 Nut driver Parts No ; DTL-0006 	

1. Mechanism State Switch (Mode Switch) Check

Purpose: To detect accurately the mechanism state and prevent the mechanism from malfunction.

Test Equipment/Fixture	VCR State	Check Point
● Blank tape	● Eject Mode (with cassette ejected)	● Mechanism state switch (Mode Switch and Cam)

Check Procedure

1) Turn the VCR on and eject the tape by pressing eject button.
2) Remove the Cabinet Top, the Main P.C.Board and the CST Housing. Then push the CST IN/OUT switch (Loca. #137) and eject button at the same time.
3) Turn the worm (Loca. #082) of Loading Motor Assembly (Loca. #A10) to the left side (counter-clockwise) so as to align the three holes (A) of the Pinch Gear, the P.C.Gear and the Chassis.
4) Remove the Bottom Cover and then check that the groove (V) and the hole (O) of Mode S/W are aligned each other. If the above alignment is not obtained, adjust as follows.
    (1) Remove the Bracket Assembly Bottom and the Capstan Belt in the state of power off.
    (2) Remove the P.C.B Assembly, align the groove (V) and the hole (O) of Mode S/W each other and then reassemble the P.C.B Assembly.
    (3) Turn the power on and perform the various operations to check that the loading and the unloading are correct.

Check Diagram

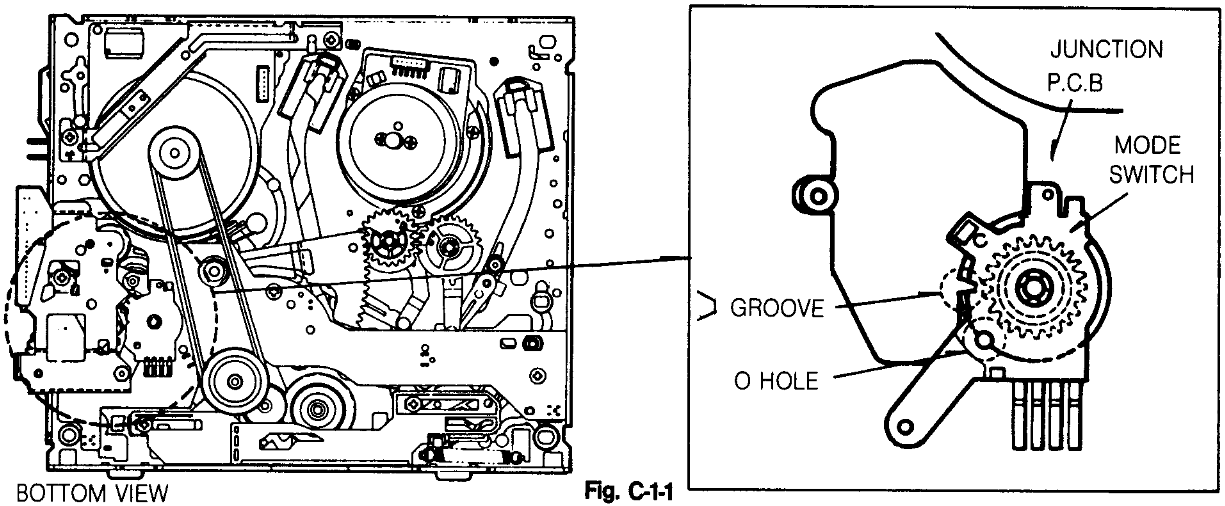


Fig. C-1-1

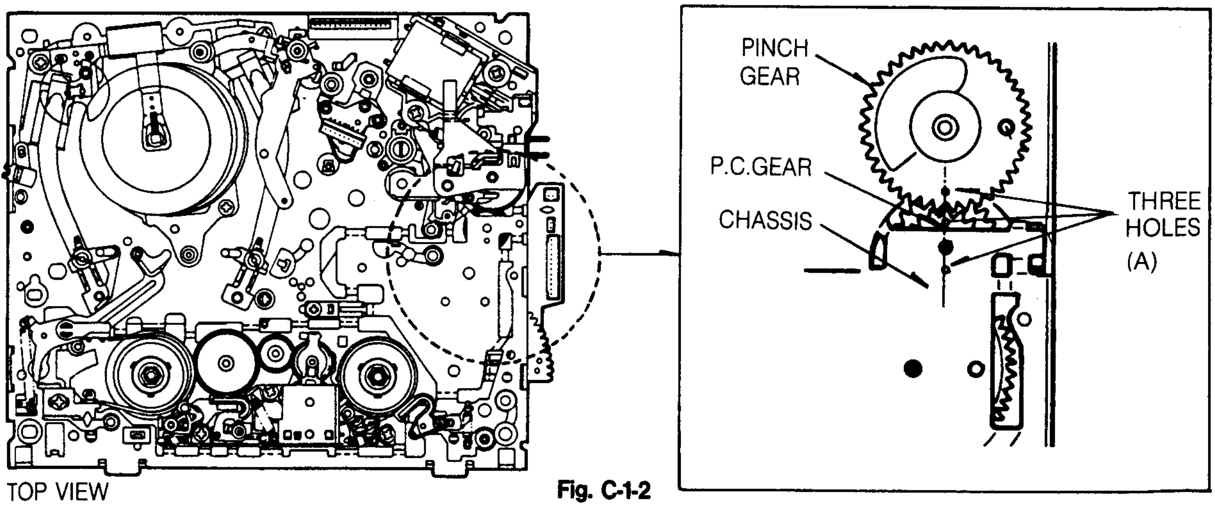


Fig. C-1-2

2. Preparation for Adjustment(To set VCR to the loading state without inserting a cassette)

1) Unplug the power cord from the AC outlet.
2) Remove the Cabinet Top and Front Loading mechanism.
3) Plug the power cord into the AC outlet.
4) Turn the VCR on and push the tact switch in the PCB Assembly.
   The VCR can accept input of each mode in this case. However the rewind and review operation cannot be performed for more than a few seconds because the take-up reel table is in the stop state and reel pulses cannot be detected.

(NOTE)
Always return the VCR to the Front Loading Mechanism Assembling State in the following order after the above operations have been performed.

1) Press the Eject button after turning the power on.
2) Wait for about 10 seconds until searching out the assembly position.
3) Assemble the Front Loading Mechanism and connect the Front Loading Mechanism Connector.
4) Refer to the "Front Loading Mechanism Disassembly" which is described previously.

3. Reel Table Height Adjustment

Purpose: To set the reels of the cassette to the specified height, thus determine the height of tape.

Test Equipment/Fixture	Preparation for adjustment	VCR State	Adjustment Points
● Master Plane ● Reel Table Height Fixture	1) Remove the Front Loading Mechanism 2) Mount the Master Plane and place the Reel Table Height Fixture on it.		● Washer under the Supply and Take-Up Reel Tables.

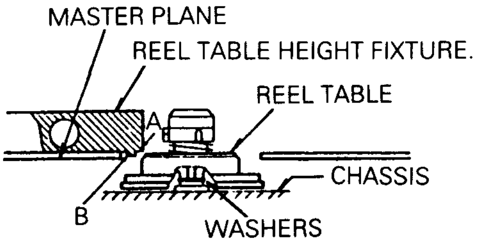
Adjustment procedure

1) Check that the Reel Table is between sections A and B of the Reel Table Height Fixture.
2) If the table is not between sections A and B of the Fixture, replace the washers(two types, 0.3mm and 0.5mm thick) in the Reel Table or adjust them.

****CAUTION****

When the Tension Arm and Tension Band are removed, adjust the tension post position and tension after reinstalling them.

Adjustment Diagram



SUPPLY AND TAKE-UP REEL TABLE

Fig. C-3

4. Tension Post Position and Tension Adjustment

Purpose: To make the tension of tape constant so that the contact between the video heads and tape is stabilized.

Test Equipment/Fixture	VCR State	Adjustment Point
● Tension Meter (Tension adjustment)	● Play without cassette and with a Tension Meter	● Holder Band(A)

Adjustment Procedures

〈Position Adjustment〉

1) Perform loading without inserting a tape and loosen the screw that attaches the Band Holder(B) to the D-Deck Mechanism Assembly.
2) Insert the (—)type driver between the Band Holder(B) and the "V" groove of the chassis.
3) Move the Band Holder(B) right and left and align the center of tension post with the center of P1.
4) Tighten the screw that attachs the Band Holder(B) to Deck Mechanism Assembly.

〈Tension Adjustment〉

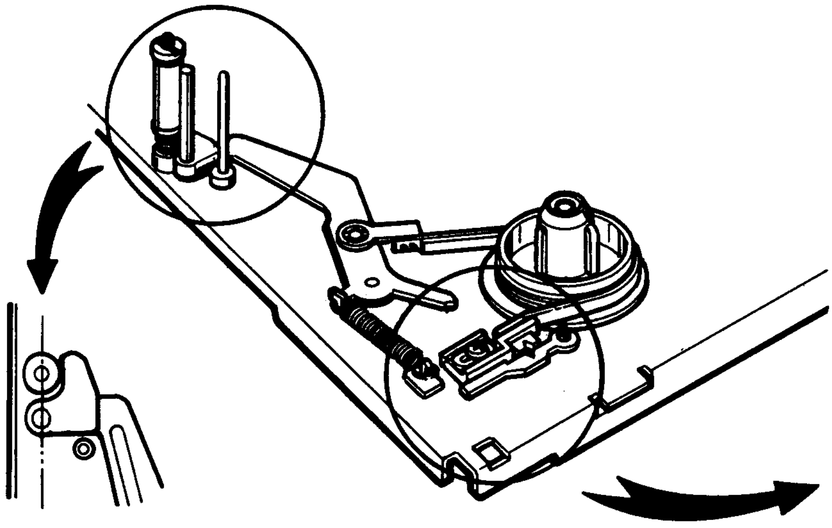
1) Play the Tension Meter and read the Tension Meter:35g·cm±2.5g·cm(reference value).
2) If the result is abnormal.
   (1) over the standard:loosen the screw, move the Band Holder(B) right a little and then tighten the screw and make sure that this adjustment is correct.
   (2) below the standard:loosen the screw, move the Band Holder(B) left a little and then tighten the screw and make sure that this adjustment is correct.

****CAUTION****

The range of movement of Band Holder(B) should be within ±1.5mm while being adjusted.

If the range is over, you should recheck the Reel Brake, Tension Arm and Spring.

Adjustment Diagram



ALIGN THE CENTER OF P1 AND TENSION POST

Fig. C-4-1

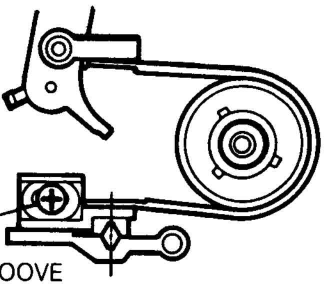


Fig. C-4-2

5. Checking Torque

Purpose: It is necessary to check the tension, torque and compression force at the tape take-up section and moving section to make the tape run smoothly and satisfy the basic performance of the VCR. Check these if the tape does not run smoothly or the tape speed is abnormal.

Test Equipment/Fixture	VCR state
● Torque Gauge ● Torque Gauge Adaptor	● Set the VCR to each operation mode without inserting a cassette. (See '2 Preparation for Adjustment')

Item	VCR Operation mode	Measurement Reel	Measurement Values
Main brake torque.	Eject	Supply and take-up reels	600g.cm or more
Slack removal torque	Unloading(power off)	Supply reel	110~200g·cm
Fast forward torque	Fast forward	Take-up reel	400g·cm or more
Rewind torque	Rewind	Supply reel	400g·cm or more
Play take-up torque	Play	Take-Up reel	90~130g·cm

Checking Method

The values are measured by using a torque gauge and torque gauge adaptor with the torque gauge fixed.

Note: This value is measured when the VCR is shifted in the unloading direction from the fast forward or rewind mode and quick braking is applied to both Reel Tables.

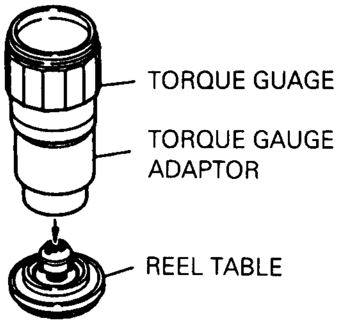


Fig. C-5

6. Guide Post Height Adjustment

Purpose: To control tape height

Test Equipment/Fixture	VCR State	Adjustment Point
● Master Plane ● Blank Tape ● Reel Table Height Jig ● Post Height Adjusting Driver ● M3 Nut Driver	● Mount the Master Plane and place the Reel Table Height Jig on it.	● Nuts on Impedance Roller ● Guide Post

1) Set the clearance between the bottom of the P1 Roller Flange and under cut of Reel Table Height Fixture to 0~0.1mm(Fig. C-6-1).
2) Set the clearance between the bottom of the Guide Post upper flange and top of the Reel Table Height Jig to 0~0.2mm(Fig. C-6-2).
3) Load and run the Tape and check that the tape does not ride over the upper and lower flanges of the guide post.
4) If the tape rides over either flange, adjust the height of P1 Roller and Guide Post as follows(Fig. C-6-3).
   - If the tape rides over the upper flange, turn the nut counterclockwise.
   - If the tape rides over the lower flange, turn the nut clockwise.

Adjustment Diagrams

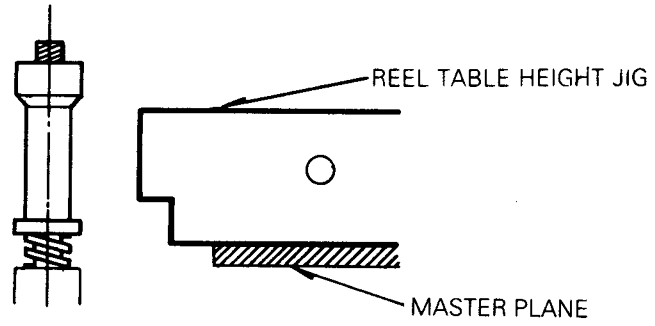

REEL TABLE HEIGHT JIG
MASTER PLANE

Fig. C-6-1

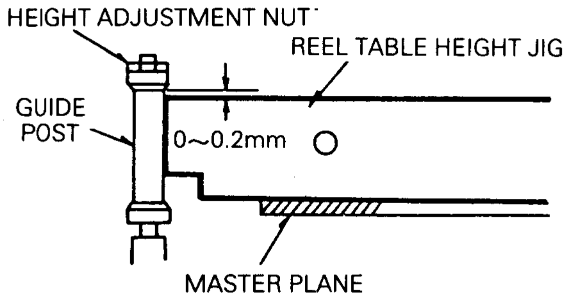

HEIGHT ADJUSTMENT NUT
REEL TABLE HEIGHT JIG
GUIDE POST
0~0.2mm
MASTER PLANE

Fig. C-6-2

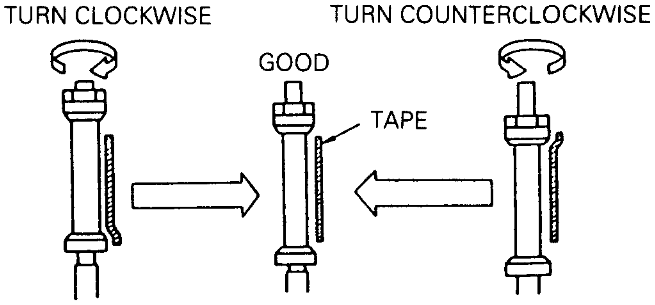

TURN CLOCKWISE
TURN COUNTERCLOCKWISE
GOOD
TAPE

Fig. C-6-3

7. Guide Roller Height Adjustment

Purpose: To regulate the height of tape so that the bottom of tape runs along the tape guide line on the lower drum.

A. Coarse Adjustment

Test Equipment/Fixture	VCR State	Adjustment Point
● Master Plane ● Reel Table Height Fixture ● Hexagonal Wrench ● Post Height Adjusting Driver	● Mount the Master Plane and place the Reel Table Height Fixture on it.	● Roller Guide Height Adjustment Screws on the Supply and Take-Up. Guide Rollers.

Adjustment Procedure

1) Align the bottom of the Guide Roller's upper flange and the top of the Reel Table Height Fixture.
2) Perform the precise adjustment next.
3) When the Guide Roller is damaged, release the Guide Roller retaining screw and then replace the Guide Roller.

Adjustment Diagram

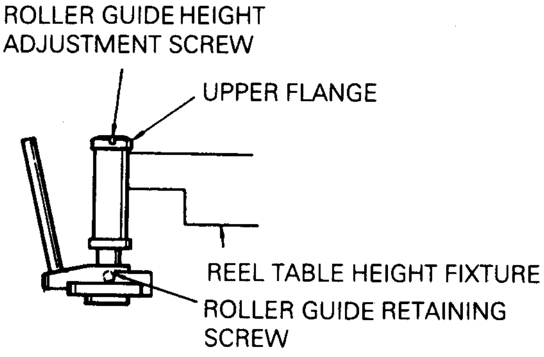

ROLLER GUIDE HEIGHT ADJUSTMENT SCREW
UPPER FLANGE
REEL TABLE HEIGHT FIXTURE
ROLLER GUIDE RETAINING SCREW

Fig. C-7-1

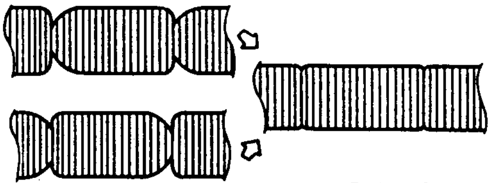
B. Precise Adjustment

Test Equipment/Fixture	Test Equipment Connection Points	VCR State	Adjustment Point
● Oscilloscope ● Post Height Adjusting Driver ● Alignment Tape ● Hexagonal wrench	● CH-1: PB RF Envelope ● CH-2: SW 3–Hz ● Head Switching Output Point ● RF Envelope Output Point	● Play an alignment tape	● Guide Roller Height Adjustment Screws.

Adjustment Procedure

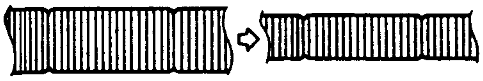
1) Play an alignment tape after connecting the probe of the oscilloscope to RF Envelope Output Test Point and Head Switching Output Test Point.
2) Tracking control(in PB mode): Center position(When this adjustment is performed after the drum assembly has been replaced, set the tracking control so that the RF output is maximum.)
3) Height adjustment screw: Flatten the RF waveform.
4) Turn(Move) the tracking control(playback) clockwise and counterclockwise.(to the right and left)
5) Check that the drops of RF output are uniform at the start and end.

Waveform Diagrams



Trun the Roller Guide Height Adjustment Screw slightly to flatten the waveform.

Fig. C-7-2

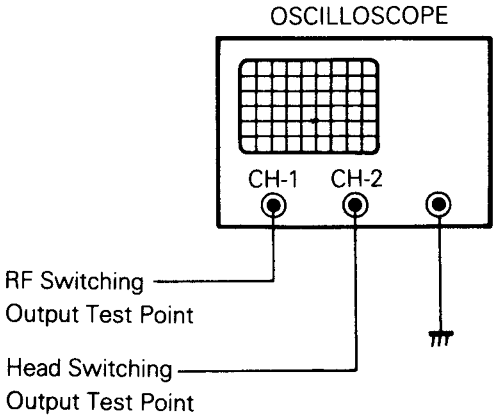


Tracking control at center

Turn(Move) the tracking control to both directions.

Fig. C-7-3

Connection Diagram


OSCILLOSCOPE
CH-1
CH-2
RF Switching Output Test Point
Head Switching Output Test Point

8. Audio/Control(A/C) Head Adjustment

Purpose: To keep the contact between the tape and head so that the specificed track is recorded and played back.

A. Coarse Adjustment

Test Equipment/Fixture	VCR State	Adjustment Points
● Master Plane ● Reel Table Height Fixture ● M3 Nut Driver	● Mount the Mater Plane and place the Reel Table Height Fixture on it.	● Special screw ● Cone Point Screw for tilt ● Azimuth Adjustment Screw ● A/C Head Adjuster
● Blank tape	● Run the blank tape	

Adjustment procedure/Adjustment Diagram

1) Tighten the spring section of the special screw so that it protrudes 6.4mm(approx.) over the top of Head Base(1).

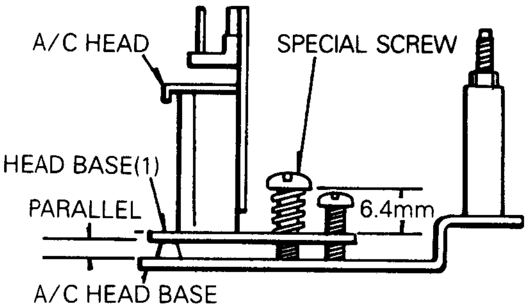

A/C HEAD
SPECIAL SCREW
HEAD BASE(1)
PARALLEL
6.4mm
A/C HEAD BASE

Fig. C-8-1

2) Turn the Azimuth Adjustment Screw and Cone Point Screw so that the Head Base(1) and A/C Head Base are parallel.

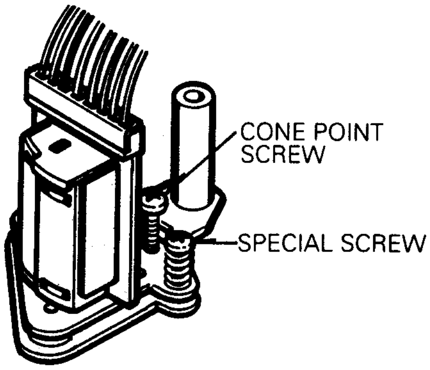

CONE POINT SCREW
SPECIAL SCREW

Fig. C-8-2

3) Turn the A/C Head Adjuster until the clearance between the Master Plane and Head Base(1) is approx 1.2mm.

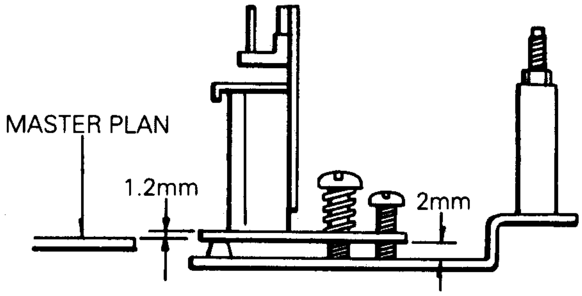

MASTER PLAN
1.2mm
2mm

Fig. C-8-3

4) Remove the adjustment fixture, load a blank tape and set the VCR to the play mode.
5) Check that there is no conspicuous curling and riding over around the A/C head. If there is conspicuous curling or riding over, readjust the Cone Point Screw, Azimuth Adjustment Screw and A/C Head Adjuster. When the bottom edge of tape is 0.20~0.25mm from the bottom edge of the control head's core, the height of A/C head is ideal.

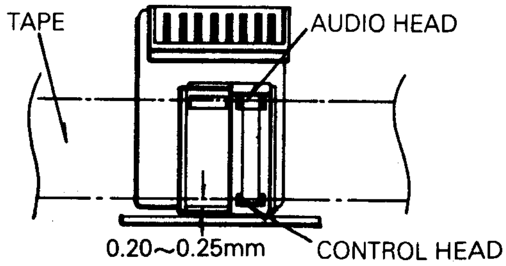

TAPE
AUDIO HEAD
0.20~0.25mm
CONTROL HEAD

Fig. C-8-4

6) Perform the precise adjustment continuously.

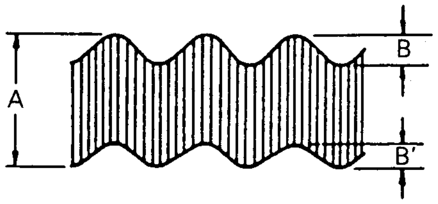
B. Precise Adjustment

Test Equipment/Fixture	Test Equipment Connection Point	VCR State	Adjustment Points
● Oscilloscope ● Alignment tapes ● M3 Nut Driver	● Audio output jack	● Play an alignment tape 1KHz, 7KHz sections	● Azimuth Adjustment Screw ● A/C Head adjuster ● Cone point screw

Adjustment Procedure

1) Connect the probe of oscilloscope to audio output jack.
2) Adjust the Azimuth Adjustment Screw, A/C Head adjuster and cone point screw slightly and alternately so that a Audio 1KHz output is maximum and flat.(minimum fluction)
3) Adjust the Azimuth Adjustment Screw slightly and alternately so that the Audio 7KHz output is maximum.

Waveform Diagram



A:Maximum BB':Minimum

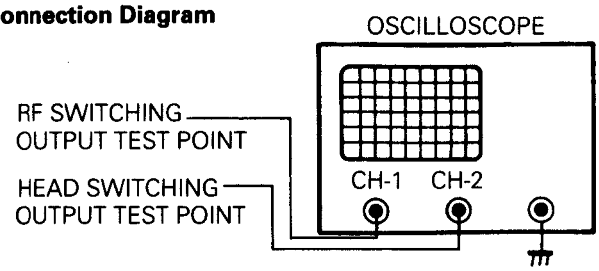
Fig. C-8-5

9. X-Value Adjustment

Purpose: To obtain compatibility with other VCRs.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Points
● Oscilloscope ● Alignment tapes ● Post Height Adjusting Driver	● CH-1:PB RF Envelope ● CH-2:SW 30Hz ● Head Switching Output Test Point ● RF Envelope Output Test Point	● Play an alignment tape	● X Adjust

Connection Diagram


OSCILLOSCOPE
RF SWITCHING OUTPUT TEST POINT
HEAD SWITCHING OUTPUT TEST POINT
CH-1
CH-2

1) Insert a cassette tape, and then "AUTO TRACKING" will be displayed on the Digitron, then push the Tracking ⊕ or ⊖ Keys one time as soon as possible to make the VCR release the Auto Tracking.
2) Turn the Adjust X to the maximum RF Envelope level when the VCR is free from the Auto tracking.
3) If RF envelope output is maximized from the center click position in right direction(clockwise), set the tracking control to the center and turn the X Adjust counterclockwise.
4) If in left direction(counterclockwise), turn it clockwise by same method.
5) In case of the 30 μ m, head will trace over a 60 μ m width track, readjust it so that RF Envelope output begins falling at the same angle when tracking control is turned either left or right.

Adjustment Procedure

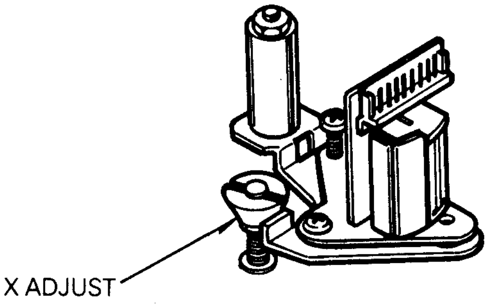


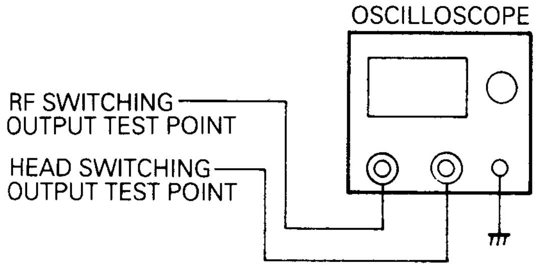
Fig. C-9

10. Adjustment after Replacing Drum Assembly(Video Heads)

Purpose: To suppress drift in the height relative to the Guide Roller and drift of the X Value after replacing the drum.

Test Equipment/Fixture	Test Equipment Connection Points	VCR State	Adjustment Points
● Oscilloscope ● Post Height Adjusting Driver ● Alignment tape ● Blank tape ● M3 Nut Driver	Checking the flatness ● CH-1:PB RF Envelope ● CH-2:SW 30Hz ● Head Switching Output Point ● RF Envelope Output Point	● Run the blank tape ● Play an alignment tape	● Guide Rollers Precise Adjustment ● Switching point ● Tracking point ● X-Value

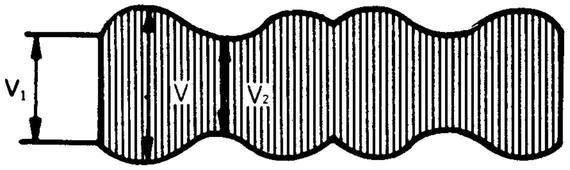
Connection Diagram


OSCILLOSCOPE
RF SWITCHING OUTPUT TEST POINT
HEAD SWITCHING OUTPUT TEST POINT

Checking/Adjustment Procedure

1) Run the blank tape, check and adjust whether the Roller Guide is curling or creasing tape around the Roller Guide.
2) Check the RF envelope output flatness and adjust the Roller Guide Height while playing an alignment tape.
3) Adjust the head switching point.
4) Check that RF envelope output is maximum when the tracking is at the center click position.
5) Adjust the Tracking Preset and X-Value Adjust with X Adjust.

Waveform Diagram



V_1/V MAX $>$ 0.7
V_2/V MAX $>$ 0.8
RF ENVELOPE OUTPUT

Fig. C-10

11. Maintenance/Inspection Procedure

(1) Required Maintenance

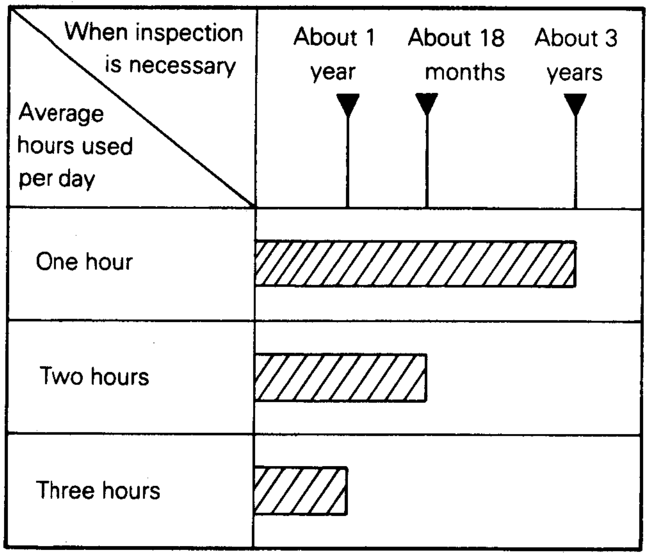
The recording density of a VCR is much higher than that of an audio tape recorder. VCR components must be very precise, at tolerances of 1/1000mm, to ensure compatiblity with other VCRs. If any of these components are worn or dirty, the symptoms will be the same as if the part is defective. To ensure good picture, periodic inspection and maintenance, including replacement of worn out parts and lubrication, are necessary.

(2) Scheduled Maintenance

Schedules for maintenance and inspection are not fixed because they vary greatly according to the way in which the customer uses the VCR, and the environment in which the VCR is used.

But, in general home use, a good picture will be maintained if the inspection and maintenance is made every 1,000hours. The table below shows the relation between time used and inspection period.

Table 1



(3) Check before starting repairs

The following faults can be remedied by cleaning and oiling. Check the needed lubrication and the conditions of cleanliness in the unit.

Check with the customer to find out how often the unit is used, and then determine that the unit is ready for in spection and maintenance. Check the following parts.

Table 2

Phenomenon	Inspection
Poor S/N, no color	Dirt on video head or worn video head
Tape does not run or tape is slack	Dirt on pressure roller, belt or flywheel belt
Vertical jitter, horizontal jitter	Dirt on video head or in tape transport system
Color beats	Dirt on full-erase head
Low volume or sound distorted	Dirt on audio/control head
Fast forward or rewind is not done or rotation is slow	Dirt on belt

(4) Supplies Required for Inspection and Maintenance

(1) Greases Kanto G-31(or equivalent)
(2) Alcohol(or freon)
(3) Cleaning Patches

5) Maintenance Procedure

5-1) Cleaning

(1) Cleaning video head

First use a cleaning tape. If dirt on head is too stubborn to remove by tape, use the cleaning patch. Coat the cleaning patch with alcohol or freon to the point indicated. Touch the cleaning patch to the head tip and gently turn the head(rotating cylinder) right and left.

(Do not move the cleaning patch vertically and make sure that only the buckskin on the cleaning patch comes into contact with the head. Otherwise, the head may be damaged.)

Thoroughly dry the head. Then test tape-running. If alcohol or freon remains on the video head, the tape may be damaged when it comes into contact with the head surface.

(2) Cleaning the tape transport system and drive system, etc, by wiping with a cleaning patch wetted with alcohol or freon.

Note:

① It is the tape transport system which comes into contact with the running tape. The drive system consists of those parts which move the tape.

② Make sure that during cleaning you do not touch the tape transport system with the tip of a screw driver and no force is applied to the system that would cause deforming.

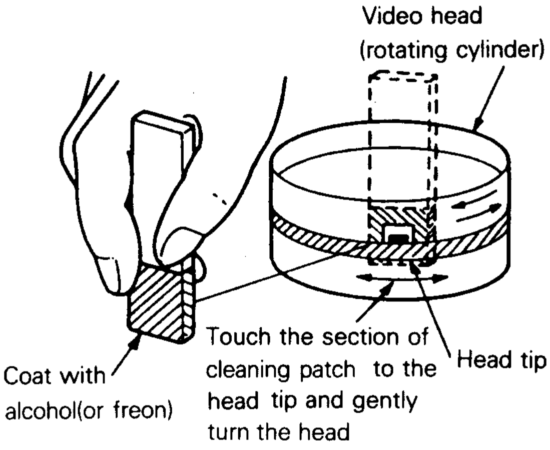

Video head
(rotating cylinder)
Coat with
alcohol(or freon)
Touch the section of
cleaning patch to the
head tip and gently
turn the head
Head tip

Fig. C-11-1

5-2) Greasing

(1) Greasing guidelines

Apply grease, with a cleaning patch. Do not use excess grease. It may come into contact with the tape transport of drive system. Wipe any excess and clean with cleaning patch wetted in alcohol or freon.

(2) Periodic greasing

Grease specified locations every 5,000hours.

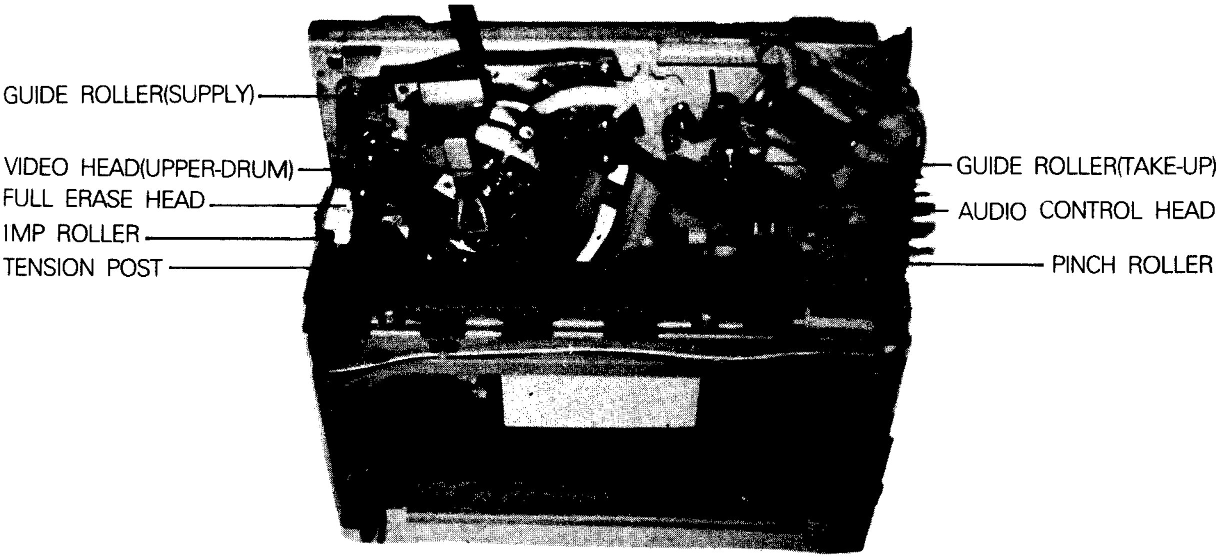

GUIDE ROLLER(SUPPLY)
VIDEO HEAD(UPPER-DRUM)
FULL ERASE HEAD
IMP ROLLER
TENSION POST
GUIDE ROLLER(TAKE-UP)
AUDIO CONTROL HEAD
PINCH ROLLER

Fig. C-11-2 Tape Transport System

Phenomenon	Inspection	Replacement	
Color beats	Dirt on full-erase head	○	→ ①
Poor S/N no color	Dirt on video head	○	→ ②
Vertical jitter	Dirt on video head	○	→ ③
	Dirt in tape transport system		
Low volume, Sound distorted	Dirt on audio/control head	○	→ ④
Tape does not run. Tape is slack	Dirt on pinch roller	○	→ ⑤

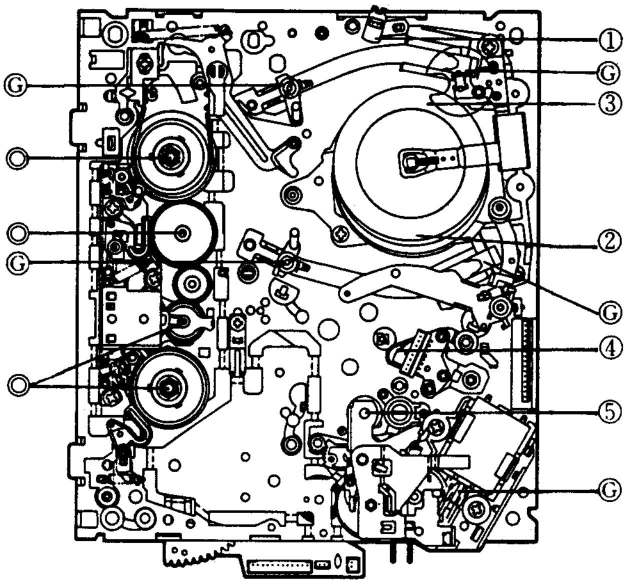


Fig. A-12 Top View of Mechanism

Phenomenon	Inspection Location	Replacement	
Do not fast forward or rewind, or rotation is slow	Dirt on reel belt	○	→ ⑥
Tape does not run			
Slack tape			

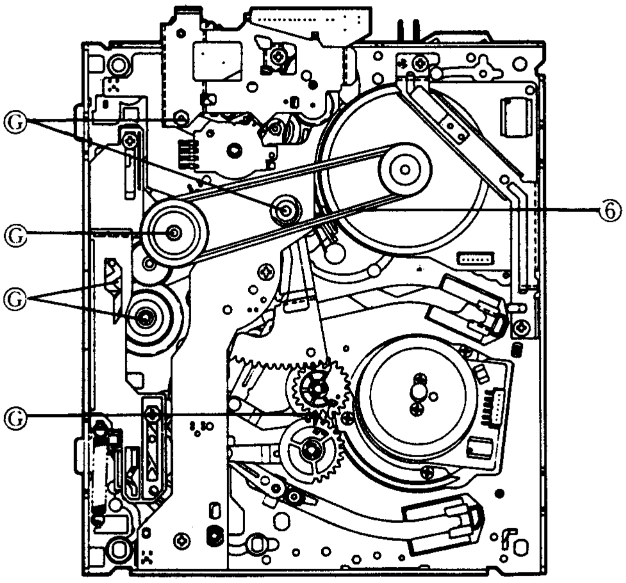


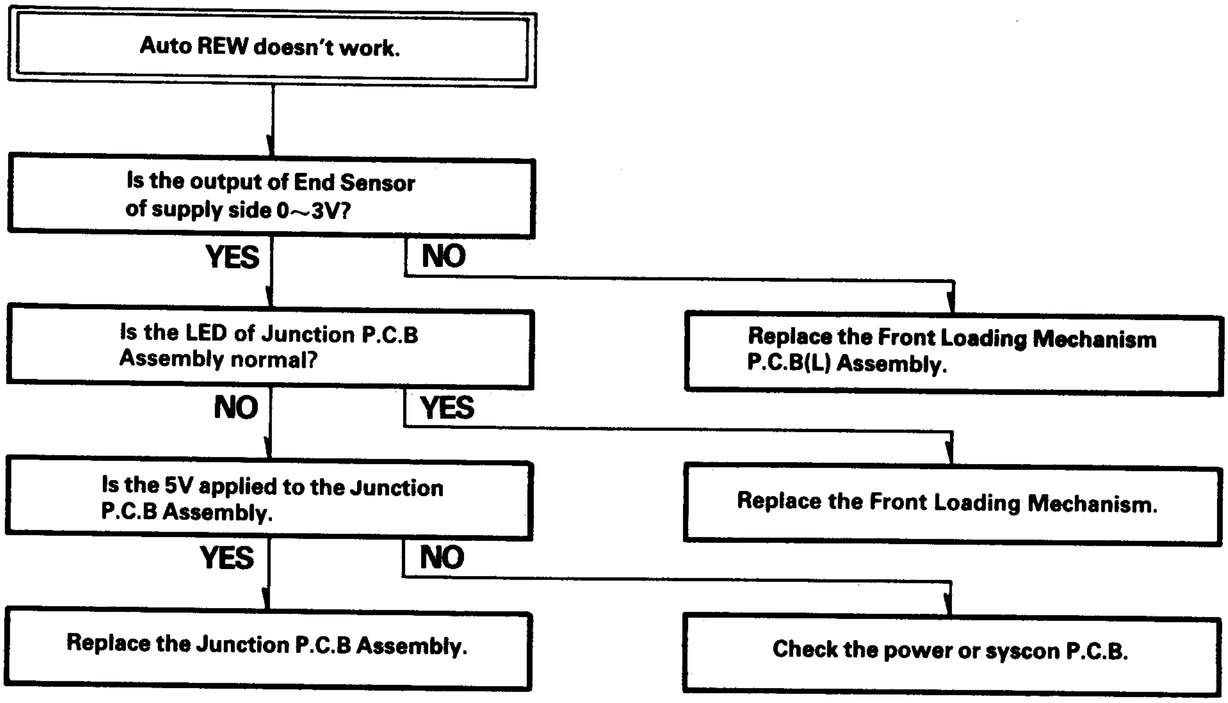
Fig. A-13 Bottom View of Mechanism

Ⓖ:Grease

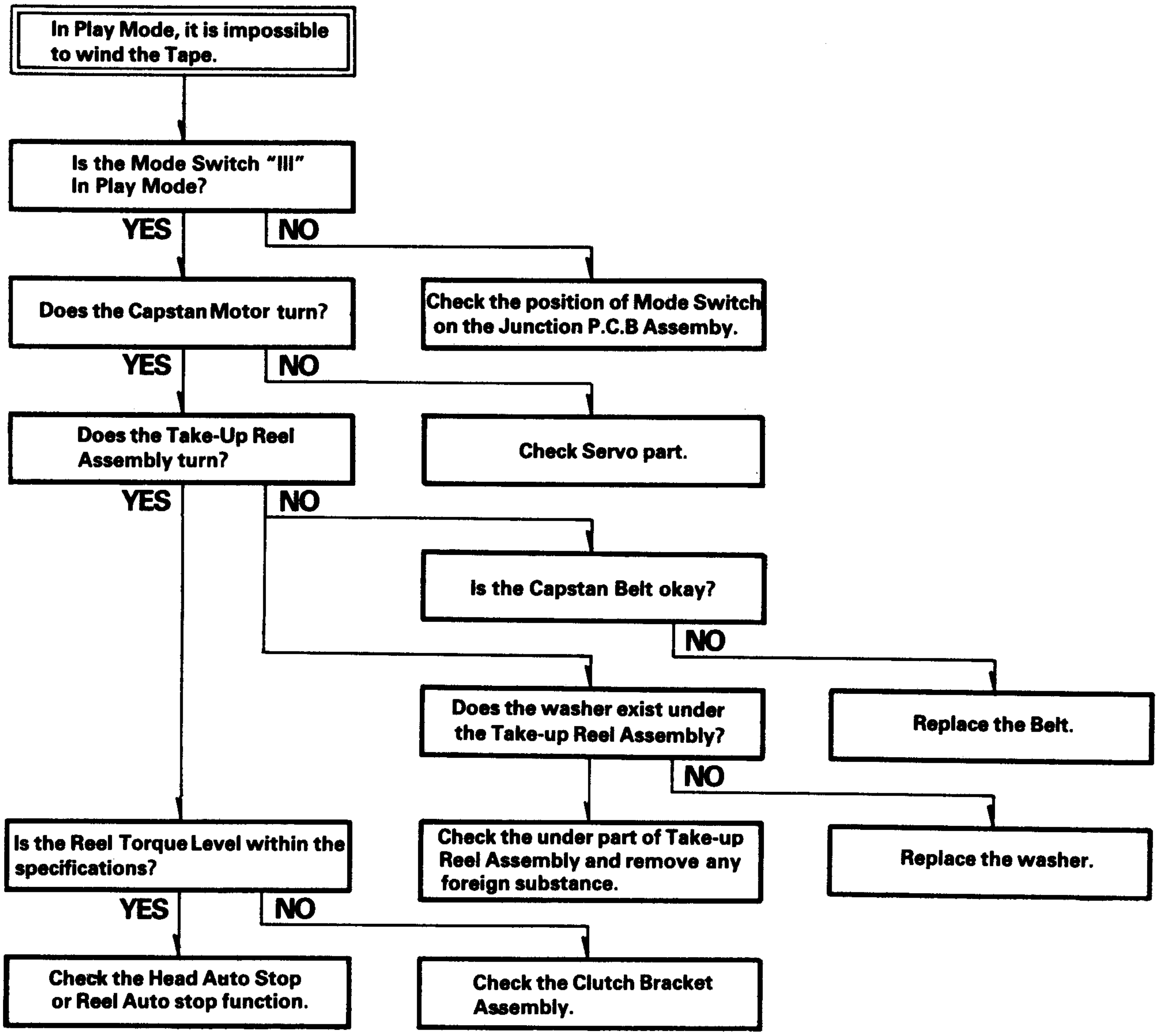
Note: If locations marked with ○ do not operate normally after cleaning, check for wear and replace. See the EXPLODED VIEWS at the end of this manual as well as the above illustrations for the sections to be lubricated and greased.

MECHANISM TROUBLESHOOTING GUIDE

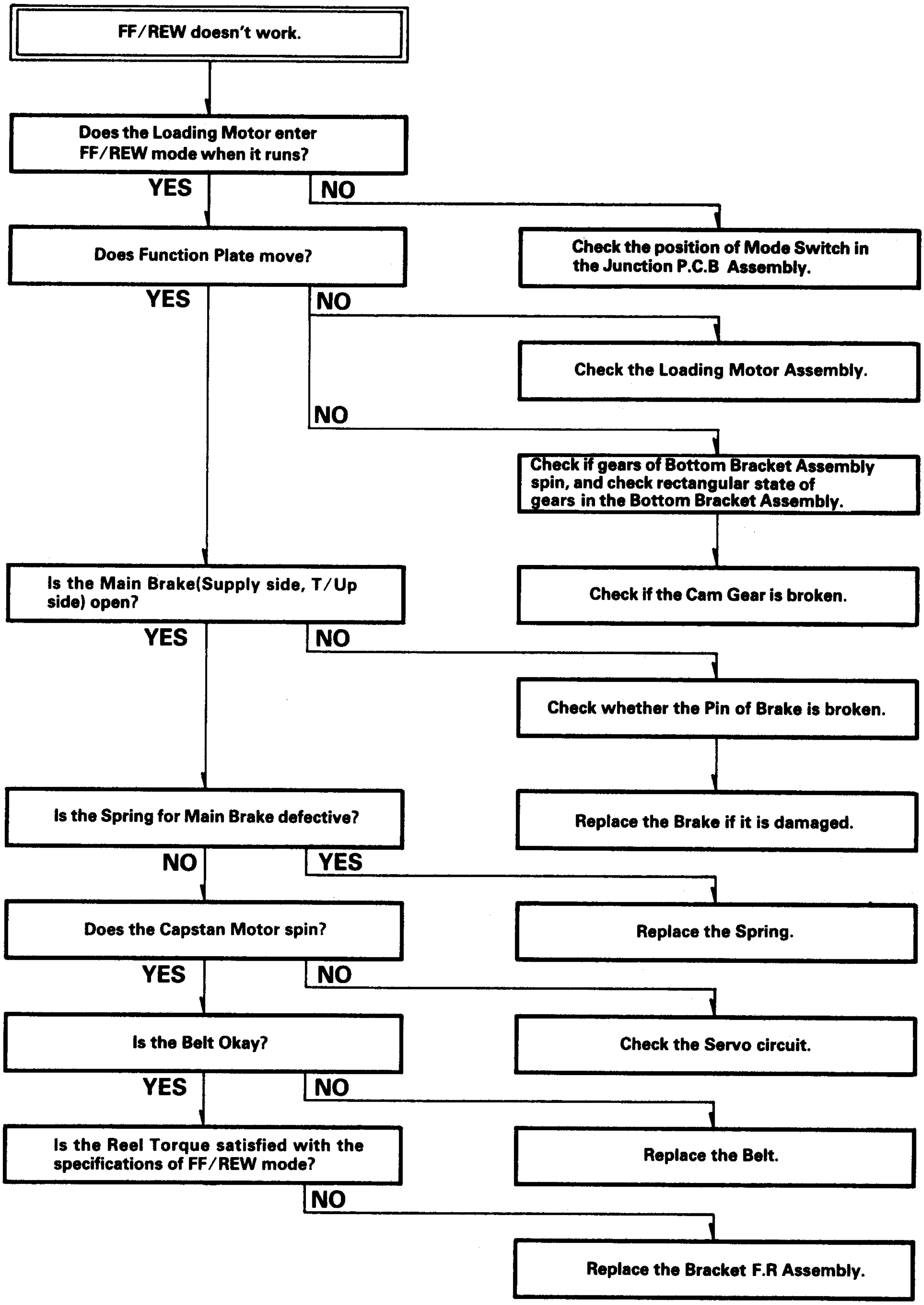
1. Deck Mechanism


Auto REW doesn't work.
Is the output of End Sensor of supply side 0~3V?
YES
NO
Is the LED of Junction P.C.B Assembly normal?
Replace the Front Loading Mechanism P.C.B(L) Assembly.
NO
YES
Is the 5V applied to the Junction P.C.B Assembly.
Replace the Front Loading Mechanism.
YES
NO
Replace the Junction P.C.B Assembly.
Check the power or syscon P.C.B.

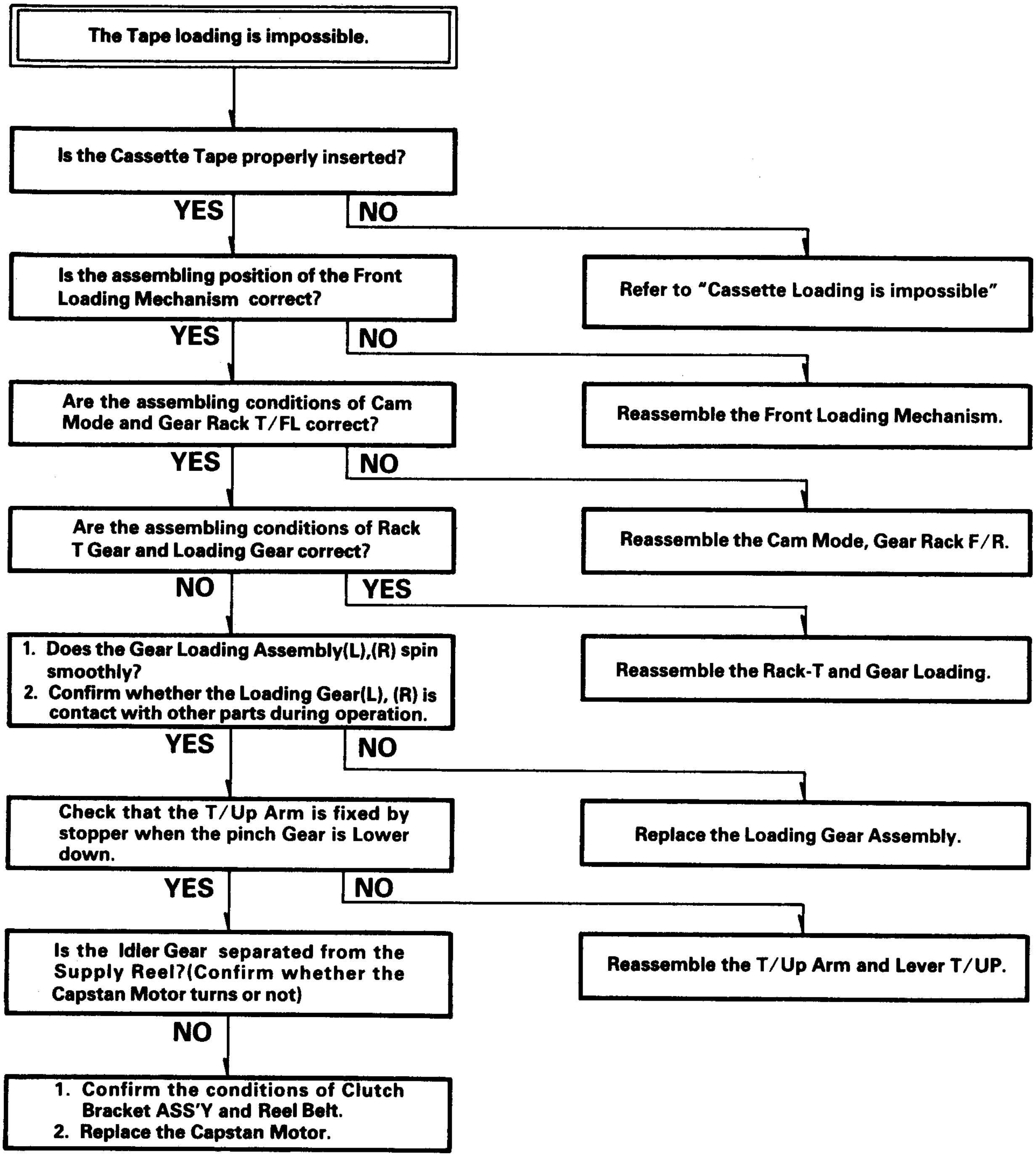
B.


In Play Mode, it is impossible to wind the Tape.
Is the Mode Switch "III" In Play Mode?
YES
NO
Check the position of Mode Switch on the Junction P.C.B Assemby.
Does the Capstan Motor turn?
YES
NO
Check Servo part.
Does the Take-Up Reel Assembly turn?
YES
NO
Is the Capstan Belt okay?
NO
Replace the Belt.
Does the washer exist under the Take-up Reel Assembly?
NO
Replace the washer.
Check the under part of Take-up Reel Assembly and remove any foreign substance.
Is the Reel Torque Level within the specifications?
YES
NO
Check the Head Auto Stop or Reel Auto stop function.
Check the Clutch Bracket Assembly.

C.


FF/REW doesn't work.
Does the Loading Motor enter FF/REW mode when it runs?
YES
NO
Check the position of Mode Switch in the Junction P.C.B Assembly.
Does Function Plate move?
YES
NO
Check the Loading Motor Assembly.
NO
Check if gears of Bottom Bracket Assembly spin, and check rectangular state of gears in the Bottom Bracket Assembly.
Check if the Cam Gear is broken.
Is the Main Brake(Supply side, T/Up side) open?
YES
NO
Check whether the Pin of Brake is broken.
Replace the Brake if it is damaged.
Is the Spring for Main Brake defective?
NO
YES
Replace the Spring.
Does the Capstan Motor spin?
YES
NO
Check the Servo circuit.
Is the Belt Okay?
YES
NO
Replace the Belt.
Is the Reel Torque satisfied with the specifications of FF/REW mode?
NO
Replace the Bracket F.R Assembly.

D.


The Tape loading is impossible.
Is the Cassette Tape properly inserted?
YES
NO
Refer to "Cassette Loading is impossible"
Is the assembling position of the Front Loading Mechanism correct?
YES
NO
Reassemble the Front Loading Mechanism.
Are the assembling conditions of Cam Mode and Gear Rack T/FL correct?
YES
NO
Reassemble the Cam Mode, Gear Rack F/R.
Are the assembling conditions of Rack T Gear and Loading Gear correct?
NO
YES
Reassemble the Rack-T and Gear Loading.
1. Does the Gear Loading Assembly(L),(R) spin smoothly?
2. Confirm whether the Loading Gear(L), (R) is contact with other parts during operation.
YES
NO
Replace the Loading Gear Assembly.
Check that the T/Up Arm is fixed by stopper when the pinch Gear is Lower down.
YES
NO
Reassemble the T/Up Arm and Lever T/UP.
Is the Idler Gear separated from the Supply Reel?(Confirm whether the Capstan Motor turns or not)
NO
1. Confirm the conditions of Clutch Bracket ASS'Y and Reel Belt.
2. Replace the Capstan Motor.

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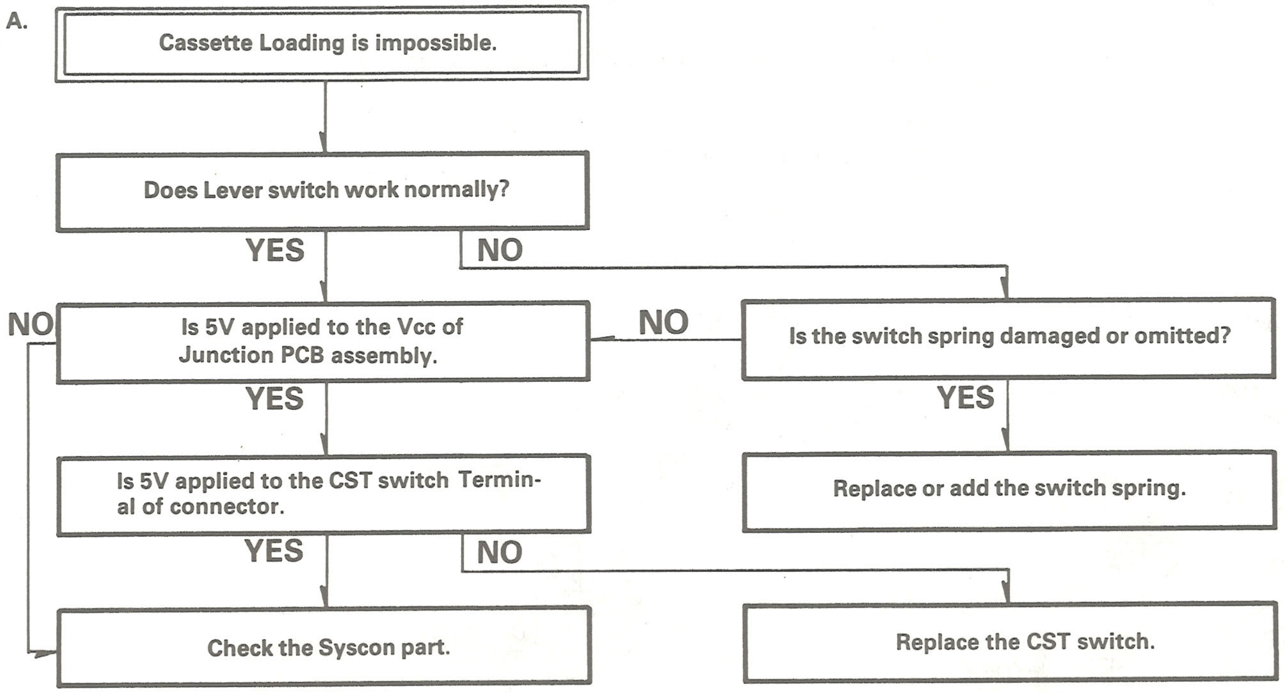
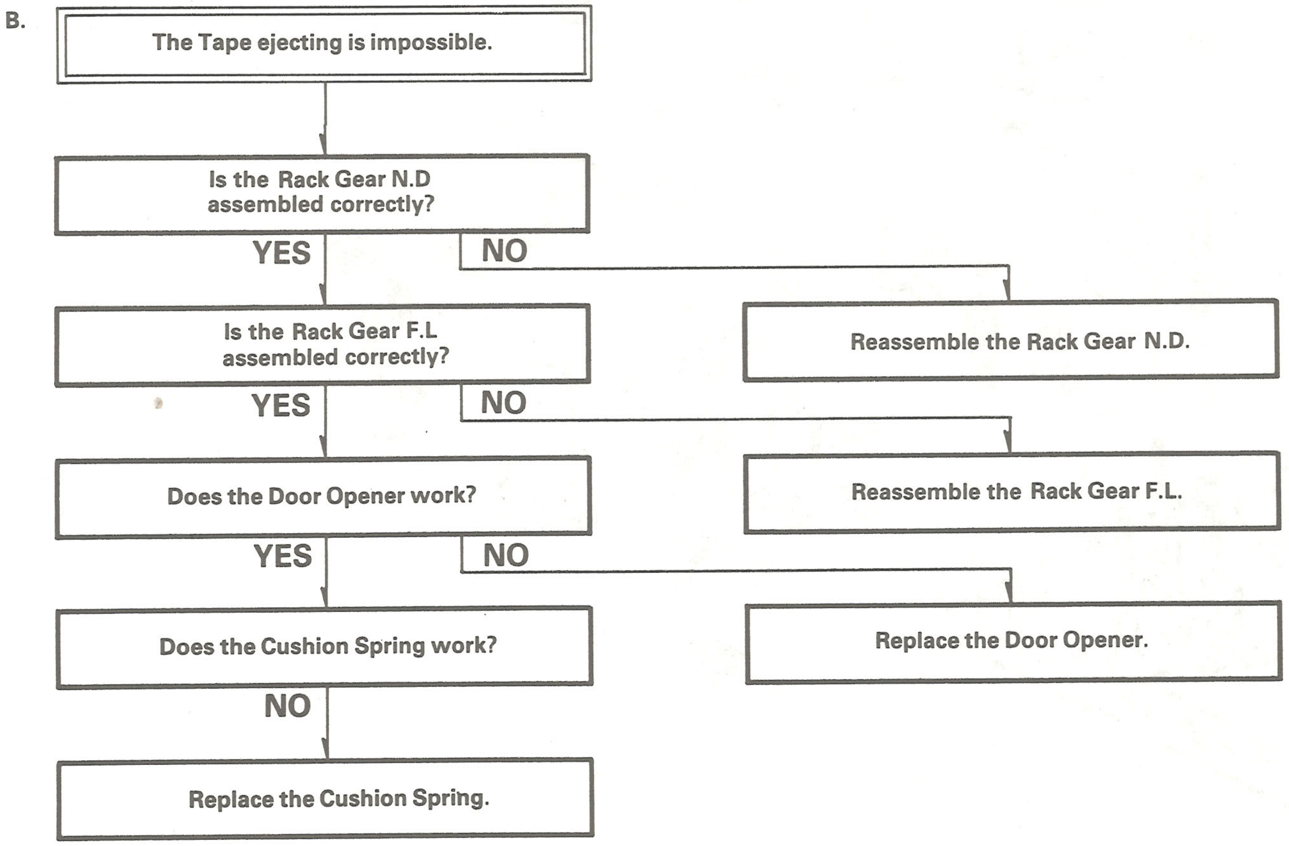
2. Front Loading Mechanism

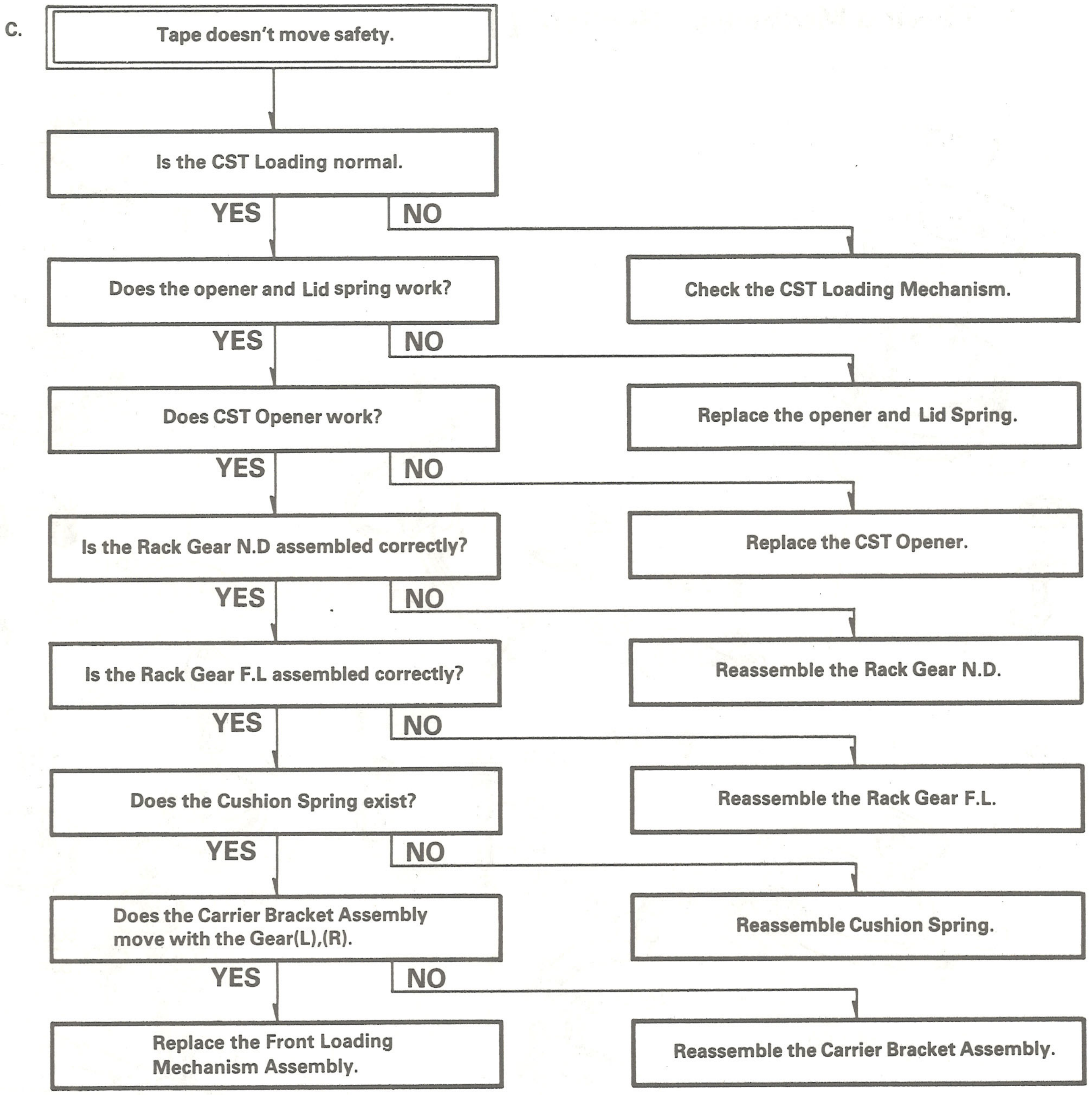
A.


Cassette Loading is impossible.
Does Lever switch work normally?
YES
NO
NO
Is 5V applied to the Vcc of Junction PCB assembly.
NO
Is the switch spring damaged or omitted?
YES
YES
Is 5V applied to the CST switch Terminal of connector.
Replace or add the switch spring.
YES
NO
Check the Syscon part.
Replace the CST switch.

B.


The Tape ejecting is impossible.
Is the Rack Gear N.D assembled correctly?
YES
NO
Is the Rack Gear F.L assembled correctly?
Reassemble the Rack Gear N.D.
YES
NO
Does the Door Opener work?
Reassemble the Rack Gear F.L.
YES
NO
Does the Cushion Spring work?
Replace the Door Opener.
NO
Replace the Cushion Spring.

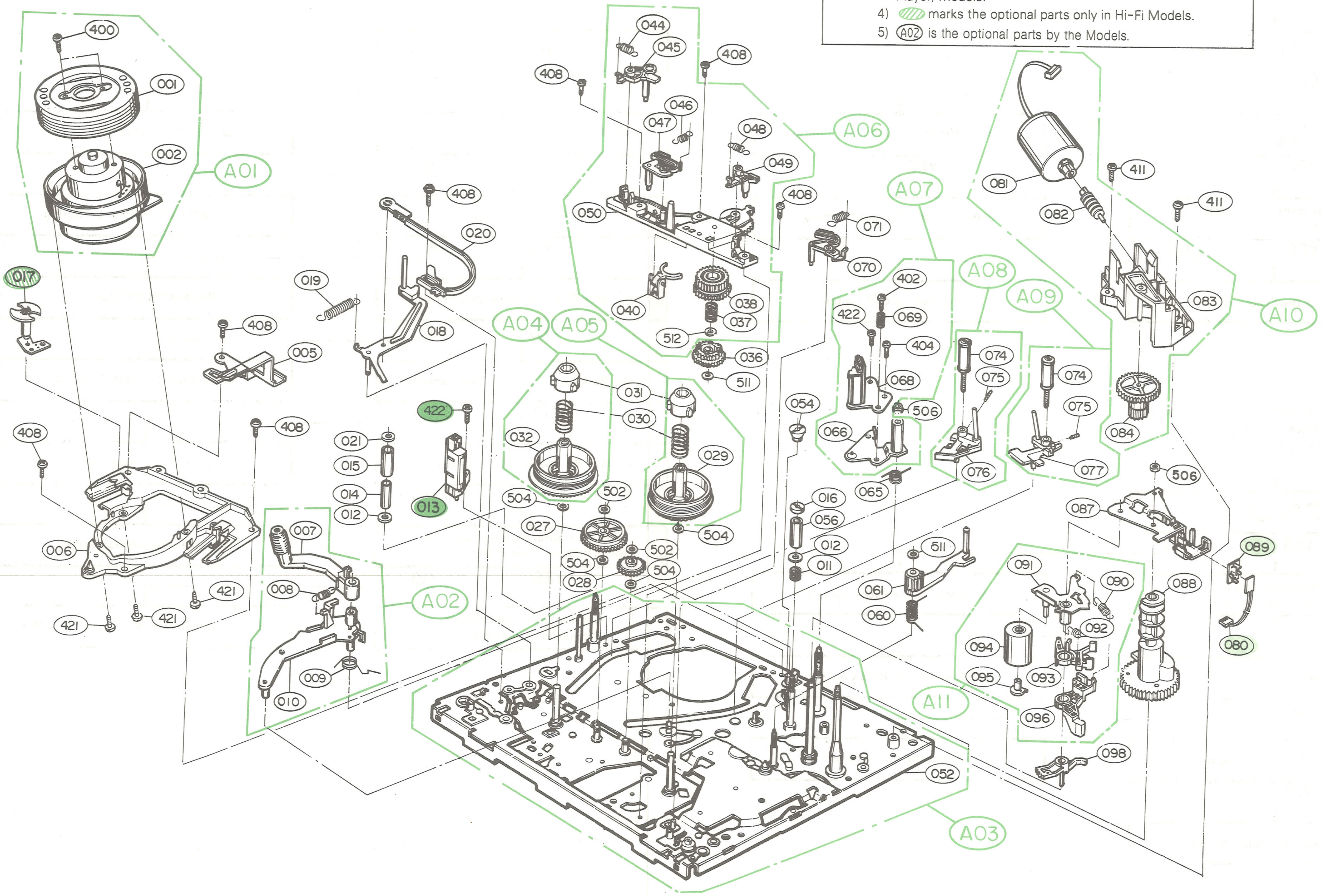
C.


Tape doesn't move safety.
Is the CST Loading normal.
YES
NO
Does the opener and Lid spring work?
Check the CST Loading Mechanism.
YES
NO
Does CST Opener work?
Replace the opener and Lid Spring.
YES
NO
Is the Rack Gear N.D assembled correctly?
Replace the CST Opener.
YES
NO
Is the Rack Gear F.L assembled correctly?
Reassemble the Rack Gear N.D.
YES
NO
Does the Cushion Spring exist?
Reassemble the Rack Gear F.L.
YES
NO
Does the Carrier Bracket Assembly move with the Gear(L),(R).
Reassemble Cushion Spring.
YES
NO
Replace the Front Loading Mechanism Assembly.
Reassemble the Carrier Bracket Assembly.

EXPLODED VIEW

1. Moving Mechanism Section(I)

NOTE) 1) Refer to "SECTION 5 REPLACEMENT PARTS LIST" in order to look for the part number of each part.
2) ● marks the optional parts only in VCR(Video Cassette Recorders) Models.
3) ○ marks the optional parts only in VCP(Video Cassette Player) Models.
4) ▨ marks the optional parts only in Hi-Fi Models.
5) (A02) is the optional parts by the Models.



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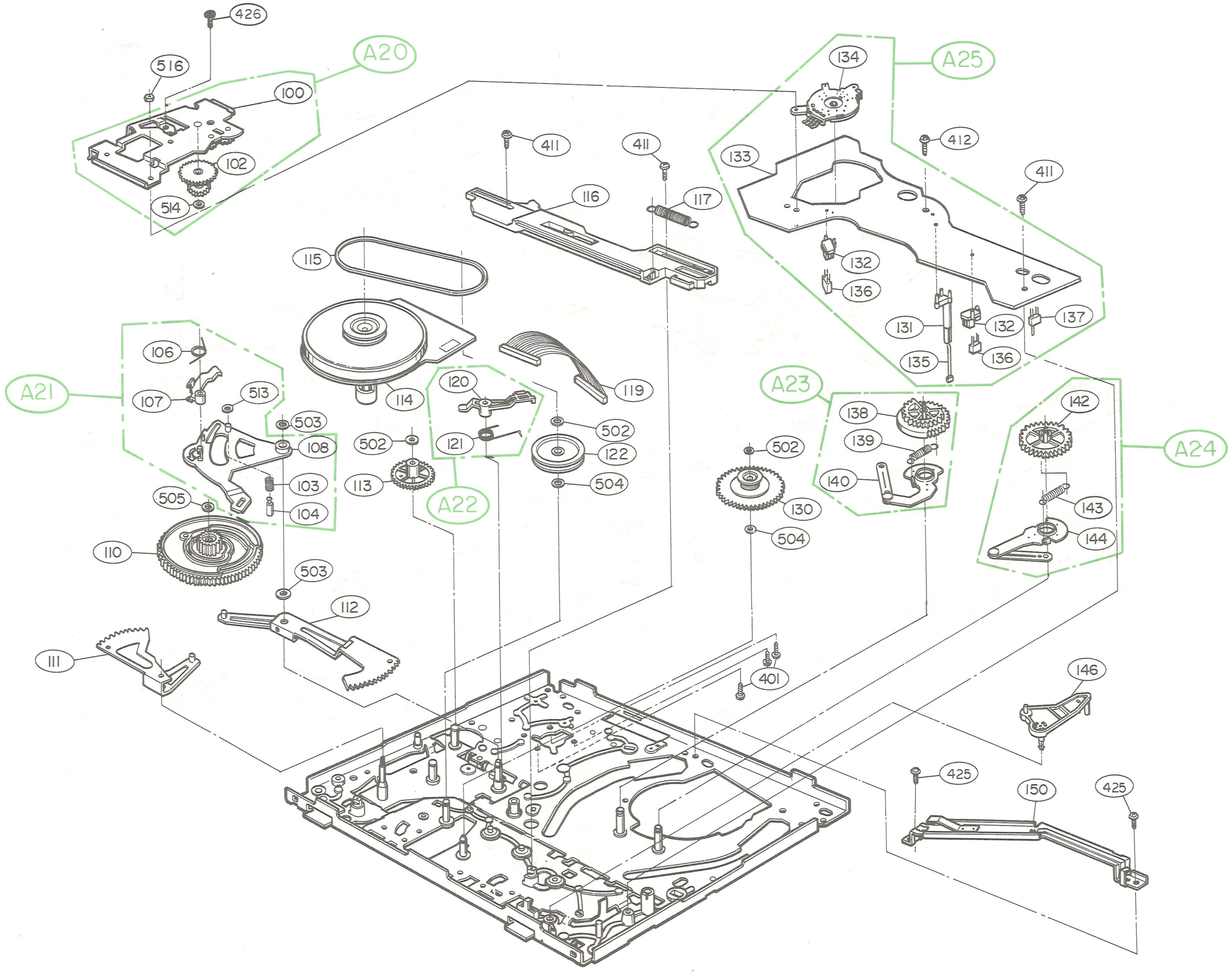
2. Moving Mechanism Section(Ⅱ)

NOTE) 1) Refer to "SECTION 5 REPLACEMENT PARTS LIST" in order to look for the part number of each part.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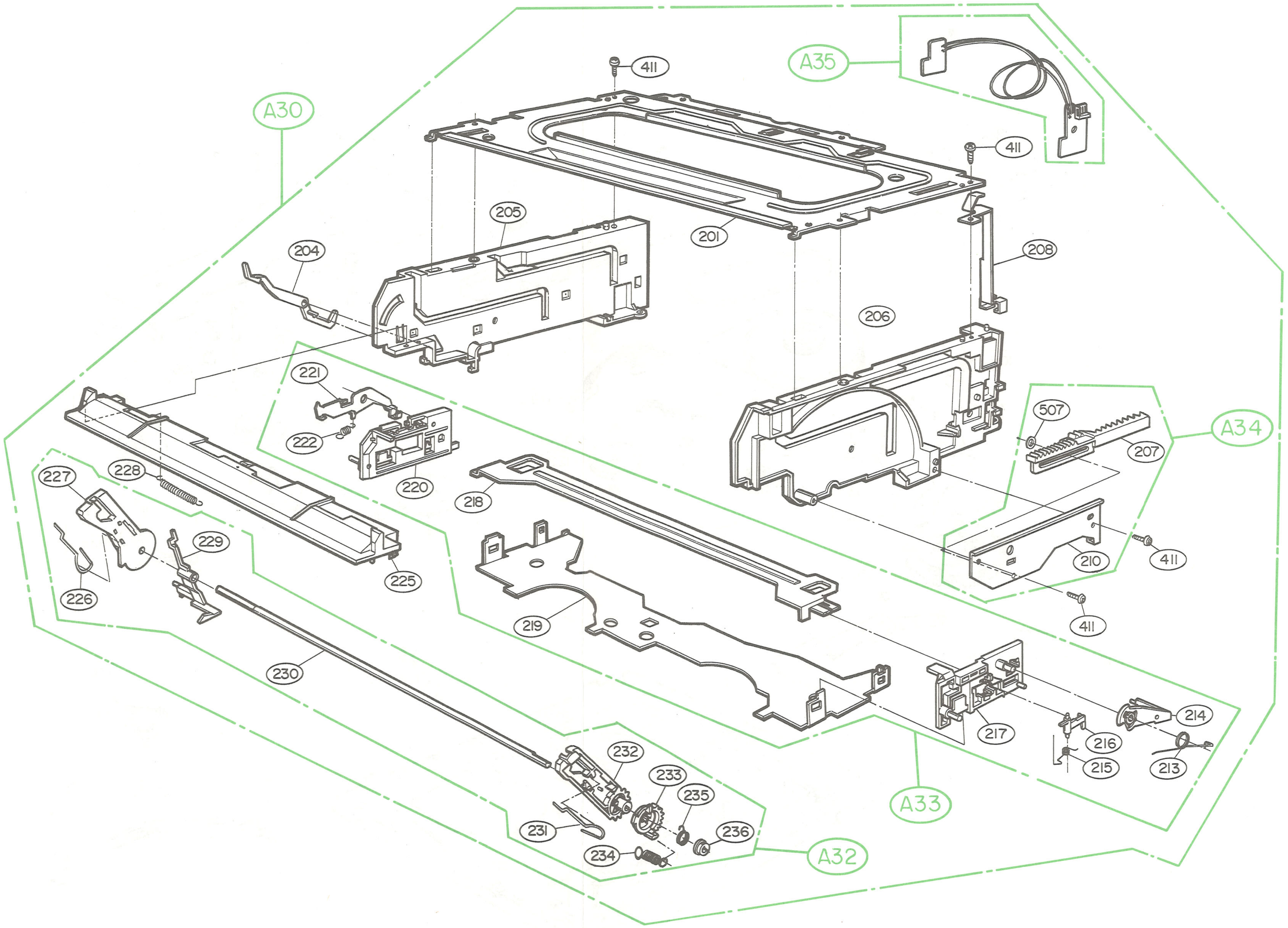
3. Front Loading Mechanism Section

NOTE) 1) Refer to "SECTION 5 REPLACEMENT PARTS LIST" in order to look for the part number of each part.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